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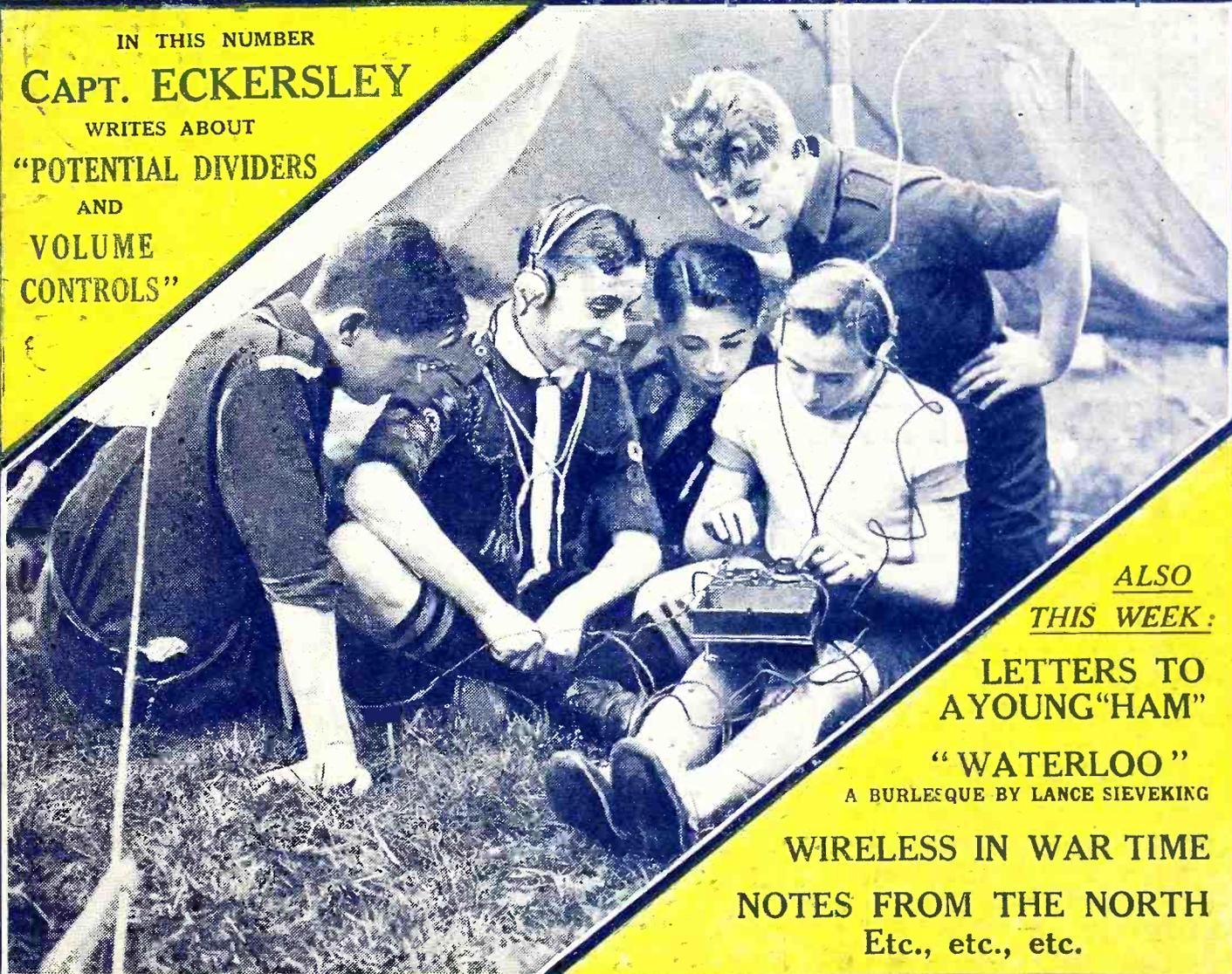
Every Thursday
PRICE
3d.

No. 526. Vol. XXI.

INCORPORATING "WIRELESS"

July 2nd, 1932.

IN THIS NUMBER
CAPT. ECKERSLEY
WRITES ABOUT
"POTENTIAL DIVIDERS
AND
VOLUME
CONTROLS"



ALSO
THIS WEEK:

LETTERS TO
A YOUNG "HAM"

"WATERLOO"

A BURLESQUE BY LANCE SIEVEKING

WIRELESS IN WAR TIME

NOTES FROM THE NORTH

Etc., etc., etc.

COMPONENTS

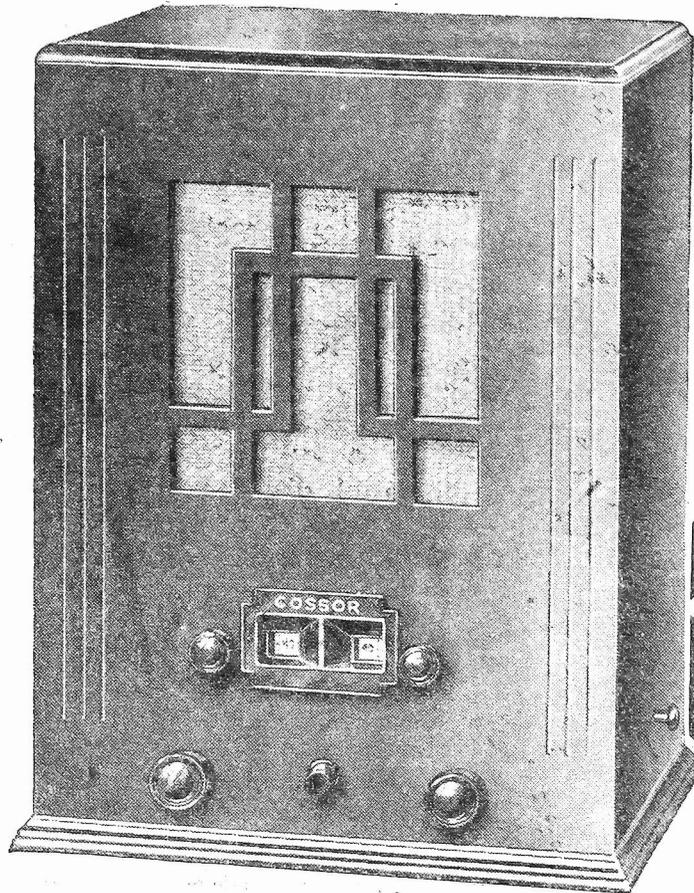
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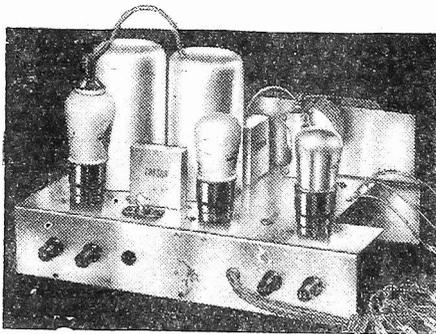
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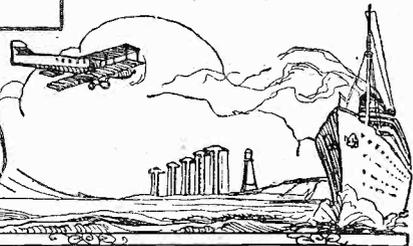
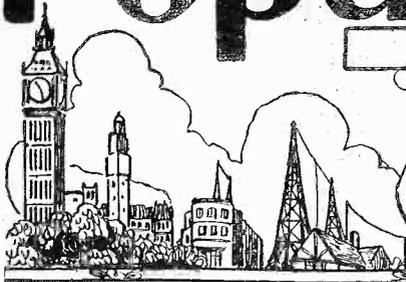
MODEL 335

To A. C. COSSOR LTD., Melody Dept., Highbury Grove, London, N.5.
Please send me free of charge Full-Size Constructional Chart C14, which tells me how to assemble the New Cossor Melody Maker, Model 335.

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RADIO NOTES & NEWS

**THE TALKING CLOCK
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 RADIO FOR TRAWLERS
 UBIQUITY OF RADIO**

A Television Note.

THIS month the B.B.C. begins to transmit television programmes by the Baird system on several evenings a week as part of the ordinary programme. Speaking at a radio convention in Chicago in May, Mr. H. A. La Fount, a Federal Radio Commissioner, is reported to have said, "We are not yet convinced that television has emerged from the laboratory and is ready to matriculate into the more severe course of adult entertainment and education."

Inventor of the "Pips."

THE cause of all the trouble is now known to me, for I understand that the inventor of those pertinacious "pips" is Mr. Arthur Fielder, who as engineer in charge of the B.B. Company's station at Nottingham introduced the pestiferous things here. Mr. Fielder is now Sales and Production manager of the radio side of the London Electric Wire Co. and Smiths, Ltd., and I hope that he agrees with me when I say that his "pips" are now a jolly good idea gone wrong.

Two-Thirds C.O.D.

WHEN is C.O.D. not C.O.D.? Why, when you have to send one-third of the amount with your order! Mr. A. Trewin, of Uganda draws my attention to the fact that a firm of radio suppliers, after advertising goods C.O.D., declined to despatch them before receiving from him one-third of their value.

Prima facie this appears to render the C.O.D. system ineffective; nevertheless, knowing the firm very well, I have an uneasy feeling that there is a sound answer to my friend's complaint on this point. I must investigate this C.O.D. business in regard to foreign or overseas orders. However, as Mr. T. is coming home in November, I don't suppose the matter is urgent.

Sound, but Premature.

I INVITE the "Newspaper World" to follow my up-to-date notes on the state of television, because it has been telling its patrons that people are tired of radio

notes—I'm not surprised, judging from some which I read in the press!—and want "really modern features."

I suppose we are to infer that radio is old-fashioned. Anyhow, the "N.W." suggests Television Notes. What would be the attraction in that, I should like to know, when not one newspaper reader in 10,000 will be practically interested in the subject for years to come.

Successful Short-Wave Explorer.

F. W. E. (Winchester) applies for membership of the H.A.C., and he certainly seems to be able to "pull 'em in" on his O.V. 2 with home-made plug-in coils. In fact, I heartily congratulate him on his work. When he has learned to read Morse

The Value of Radio.

CURIOSLY enough, by the same post comes a letter asking me to say what broadcasting has done for me. It hasn't "done for me," dear old inquirer. I am still "mine own man." However, I know what you mean.

It has introduced me to many charming and distinguished personalities. It has introduced me to a whole lot of music which, but for radio, I should not have heard. It has made me understand much more of human nature and public tastes. It has soothed and rested my mind and helped me to entertain my guests. It has set me off upon many a delightful exploration of dictionary and encyclopædia—to my great gain. It has cut down my reading and meditation by 33 1/3rd per cent—which is bad for me. It is, on balance, very good; but I wouldn't take it in exchange for my library!

The July "Wireless Constructor."

THIS month the "Wireless Constructor" features the "Localiser," a handy and inexpensive two-valver design for medium-wave local-station reception; built with twelve components. Also a Victor King design, the "Flexidyne," a four-valver with a range switch on the panel, giving you either a set for family use or a highly-selective, long-distance "four."

Mr. J. Scott-Taggart has enlarged his justly popular "Arm-chair" article and has never been more readable than he is in this number. Heaps of other "right to the point" articles, too.

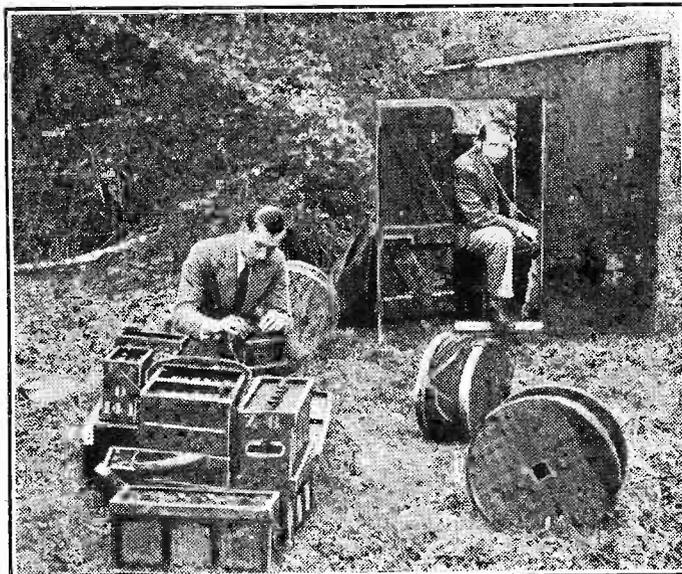
"Ariel" as a "Listener."

A CORRESPONDENT asks me upon what principles I use my domestic set. Well, first of all, I make my listening subject to my social duties, my business preoccupations and the call of the garden. I have an L.S. extension to my dining-room so that listening by my household may continue while I am at work.

I listen to all the Queen's Hall stuff—unless it is too *too*—some vaudeville turns, A. J. Alan, G. Potter (if any), certain running commentaries, V. Bartlett, "Hazards,"

(Continued on next page.)

THEIR NIGHTLY VIGIL



The B.B.C. engineers in charge of outside-broadcasts have to undergo some queer experiences, and one of the most peaceful and delightful is their annual appointment with the nightingale. Here is a view of the daylight preparations, after which everything is left "all set" with microphones concealed in likely trees ready to be switched on as necessary.

his interest will probably sink down to the amateur wavebands.

He inquires for a book containing the Morse code, and I advise him to get the Postmaster-General's Handbook for Wireless Telegraphists, which gives it and also a lot more interesting code matter. Let him ask his local bookseller to get it from H.M. Stationery Office.

NEWS—VIEWS—AND INTERVIEWS (Continued)

selected orchestras and brass bands, Radio-Paris "records," an occasional playlet and as few songs as possible. In a word, *I select* according to my taste and fancy; I do not let the stuff run on to me like a perpetual shower bath. I recall that I have a mind of my own.

A Clock that Talks.

I READ that two French engineers have invented an electric clock which has the effrontery to *speak* the time. This new horror of civilisation, which is run by accumulators, announces the hour, minute and second. But that is not the worst, it does it *every ten seconds*.



Nothing is on record about the language of the announcements; presumably the

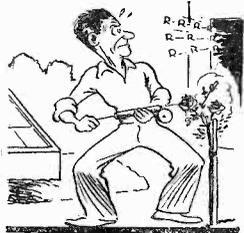
French of the broadcasting studio—10,000 miles an hour! Surely these engineers could better have devoted their genius to growing bigger and beanier French Beans!

Directional Hearing.

TWO learned men on the Medical Research Council claim to have discovered how it is that the human ear can fairly accurately determine the direction from whence sounds come. And they have used a valve oscillator to do it. I have no doubt that their work is frightfully clever, but surely a simple explanation is that the ear works like a frame aerial. Turn the frame aerial edge on to the source of the signal and you get maximum response in the telephones; turn one ear or the other towards the source of the sound, and you hear the sound better than you do if the ear is not so directed, especially when the sound travels a long distance.

Do Please Have a Heart.

JOURNALISM is darned hard work in these days, and the British sacred week-end is not always the prerogative of the journalist. When, however,



the journalist does escape for a rare Sunday at home he ought to be allowed to sleep or cultivate his garden in perfect peace.

Yet one of our staff, who pulls perhaps more than his proper weight,

and who has delighted you with many a fine circuit, is suffering from telephone call for "buckshee" information. He was even dragged from his tea-table on a recent Sunday to answer a query.

It isn't the genuine "P.W." spirit to refuse to reply—and it isn't playing the game to pester a man after hours, and on Sunday. Please lay off—or you will lose the Post Office telephone department a client.

Pity the Poor B.B.C.

A SURVEY of the press, from Land's End to John o' Groats, and from Anglesey to the Wash, tells me that Wales is working steadily at a campaign for a Welsh nationalist movement on the part of the B.B.C., and that the Highlanders are loosening their dirks because Sir John cannot provide them with special programmes suited to their temperaments.

On top of all this the "Era" sees fit to upbraid the B.B.C. for trying to infuse a British spirit and savour into its programmes, arguing that there is no representative British spirit, but that it is the *English* spirit which is the inspiration of the world. Sometimes I feel inclined to agree with the B.B.C.'s inflexible policy of going its own road.

"SHORT WAVES"

A writer recently stated that, in his opinion, broadcast entertainment was not a tonic. And very often it isn't even entertainment.

THE WIRELESS ANNOUNCER.

Here is to-day's fashion forecast: A trough of low pressure is situated between the shoulder blades running southwards towards the waist. In the region north-west and north-east, shoulder straps may be experienced, with secondaries moving from side to side.

General Inference: Cold will be felt in many places. Surprise will be mild at first, refreshing later into a "breeze" and wind-up will occur round the coast. Further Outlook: Censored.—"Pictorial Weekly."

A man was recently chased five miles by a party of picnickers.

Perhaps next time he'll leave his portable at home.

Is your wife fond of listening in?
Not half so much as she is of speaking out.

PHYSICAL JERKS BY RADIO.

I, for one, shall not obey
Those brusque commands at break of day.
Upon my virtuous couch I'll stay
Sunk in a sleep seraphic.
A sedentary life I lead,
But, where the buses swerve and speed,
I get what exercise I need—
Dodging the "one-way traffic."

Another Spot of History.

RESUMING this week my historical notes on valves, I may point out that after the first thorium attempts we reverted to alkaline earth metals for filament coatings, using oxides of barium and strontium, or colloidal mixtures of barium and strontium carbonates. The tungsten filament gave an emission of 5 milliamps per watt; thorium gave 25 milliamps per watt, and barium gave from 100 to 150 milliamps per watt. Caesium gives 200-250 milliamps.

A Pertinent Comparison.

TAKE the famous V. 24 valve, shaped like a baby sausage, a bright emitter. Worked from a 6-volts accumulator it required 0.75 ampere, i.e. 4.5 watts. And we got an amplification factor of 6 and an impedance of 20,000 ohms, that is a mutual conductance of 0.3 milliamps per volt.

A modern comparable valve takes 0.1

ampere at 6 volts, has an "M" value of 15, impedance 7,500 ohms, and M/C 2.0. It has characteristics equal to six V.24's in parallel. (This thrilling instalment to be continued in the sweet by-and-by.)

"Nation Shall Speak Peace, etc."

WELL, you all know the B.B.C.'s motto. So you will be interested in a report from Berlin that broadcasting is being used intensively by the Soviet government for the military instruction of its thrice happy subjects.

Last month the particular kind of peace which was being broadcast was a course of lessons on gas warfare. Dearie me!

I never could quite grasp this socialism racket, but I have certainly always imagined, doubtless in my ignorance, that it eschewed war and bloodshed, etc.

I am sorry for the radio-instructed warriors; a free people could knock them cold—and probably will, one day. And serve 'em right, for messing about with good old radio!



Radio Telephones for Ships.

ONE of the most important developments in marine radio is the decision of the Post Office to install wireless telephone apparatus in eight coastal wireless stations round these islands, thus bringing the number of stations so equipped to eleven.

Marconi's have designed a simple radio-telephony set for use on trawlers, whalers and small coasting vessels which would not normally carry wireless equipment. The present use of telephony will be limited to communication between ships and coast stations, the messages being sent on to their destinations by landline telegraph.

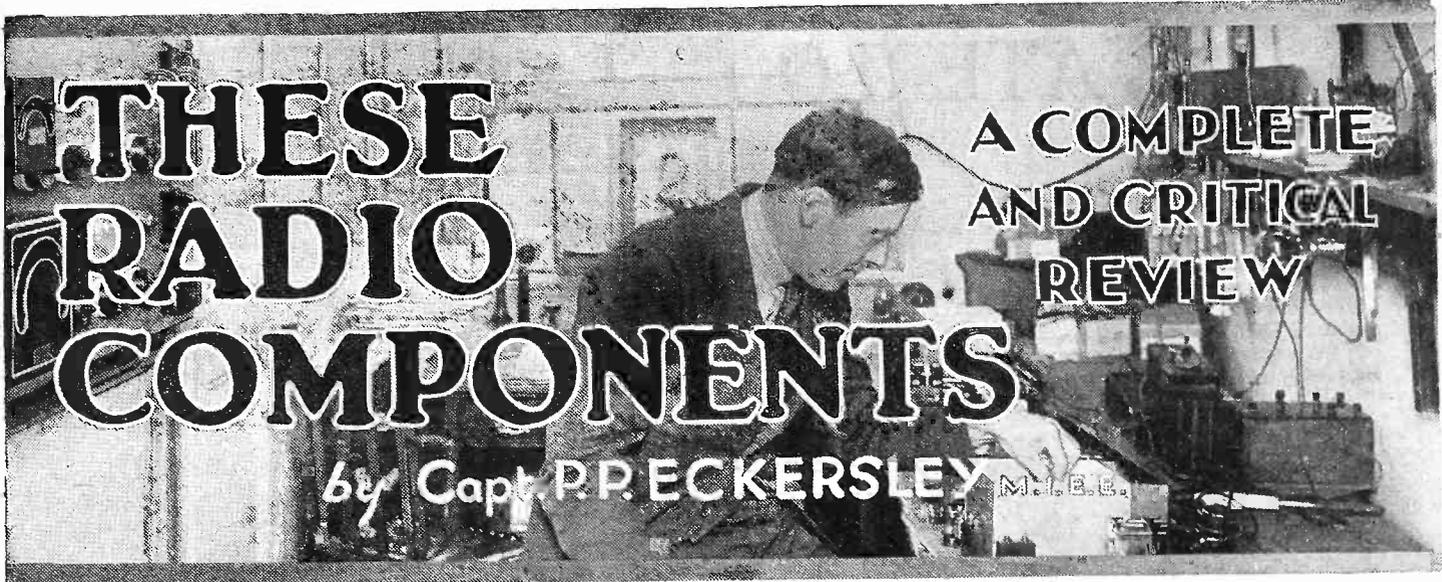
The Ubiquity of Radio.

I REMEMBER reading that the famous Dr. Livingstone was both annoyed and puzzled when he found a modern silver spoon in the depths of what he fondly imagined to be virgin African jungle. Then, too, I recall the annoyance of a man who had fled to the coral islands of the South Pacific only to find washed up on his shore a modern radio valve in good working order.



Now I receive a letter from an acquaintance who is buried in the Belgian Congo, to the effect that he has found in the heart of the gorilla country a pair of high resistance head-telephones. If he had looked more closely I expect he would have found a "Cosmic" blue print.

ARIEL,



POTENTIAL DIVIDERS AND VOLUME CONTROLS.

Continuing his discussion of last week, our Chief Radio Consultant deplores the fact that many manufacturers of potential dividers do not provide proper log-law grading.

I SHOWED, elaborately and fully, in my last article, why the resistance between one terminal of a potential divider and the slider should *not* be proportional to the degrees of arc of turning of the handle. If it were, the volume is not smoothly regulated and all the adjustment of volume comes at one end of the potential divider.

Try Both Ways.

But no potential dividers *are* uniformly graded, and so for this reason see that you connect them round the way which gives the smoothest control—it's better to try it, than to try and work it out! I cannot see why the makers of potential dividers cannot give us proper log-law grading—very few, if any, do. There's some kind of "law," I suppose, but no two seem alike, and not one is decently graded—not one I've seen, anyway.

But so far I have talked about low-frequency volume controls. What of high-frequency? Most people use the

ordinary potential divider for this, and get into a terrible mess. Because these dividers have (a) self-capacity, and (b) rather crazy contacts for high-frequency current work.

Think of the circuit of Fig. 1.

It looks awfully nice until you re-draw it as Fig. 1a.

Now, while C_1 is in parallel with C_2 and hence innocuous, C_2 draws current through the potential divider, a current influenced by the slider setting. Hence volume is regulated in two ways, partly by the potential divider as such, partly by the self-capacity of the valve's influence and the slider's position. No, it's nasty!

It Is Not Satisfactory.

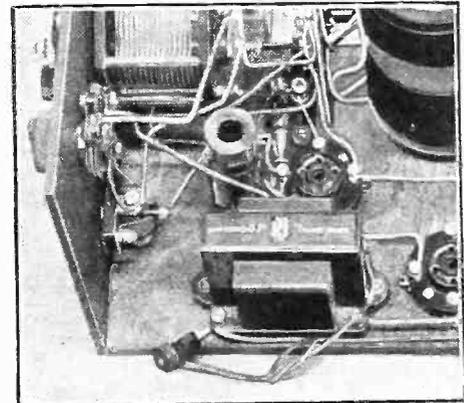
If you just connect a variable resistance across the tuned circuit you alter selectivity with volume. Variable condenser shunts tend to upset tuning; resistances in series with grids have self-capacities. No; we haven't found the royal road to success for high-frequency volume controls. Certainly most of the ordinary potential dividers with wire wound into "muckite" make hideously bad contact for H.F. work, too. I do not know the real solution, yet—I must think it over! Might make a nice patent for the man who succeeded!

One cannot minimise the importance of H.F. volume controls. The detector grid filament voltage is critical—lots of people either put too much into their detectors on the local station or not enough from the

distant. A high-frequency volume control which does *not* interfere with selectivity seems an essential.

Let's go back to low-frequency volume controls. People seem to do some beastly things with transformers, such as shorting the primary and shorting it more and more for lower volume. Transformer technique

SHORT—AND SWEET



When wiring the volume control in a circuit such as this, take care to keep the leads from the components concerned as short as possible. That is, if you want pleasing results!

is more difficult for proper volume controlling than R.C. technique.

Even the 200,000-ohm potential divider may unduly load a transformer, and so, due to transformer leakage, tend to cut top in spite of what I said about valve/capacity/transformer leakage resonance. My advice to the transformer user is use a *big* resistance potential divider.

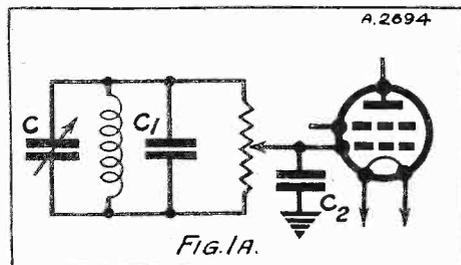
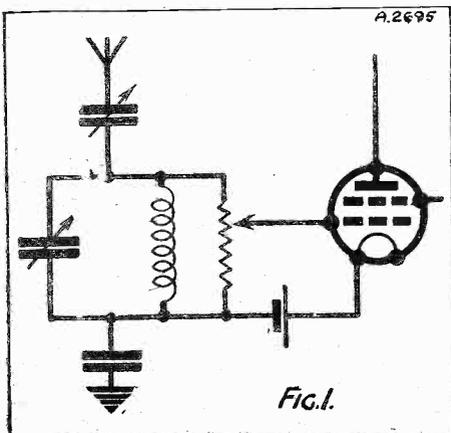
A Few "Don'ts."

Lastly, some people like to control the volume of their loudspeakers remotely. This is a very difficult matter, and one so hedged about with controversy at the present moment I only dare say very little. Let me just give you the *don'ts*!

Don't shunt the loudspeaker with a resistance, because you are bound thereby to cut top.

And *don't* put in series resistance, because this will just cut bass. You want really to get the speaker to "look back" into the same impedance always

LOOK AT THIS—AND THEN AT THIS



Here are the two diagrams to which Capt. Eckersley refers above. He explains how such a method of high-frequency volume control is not satisfactory, since its regulation is influenced by several inconstant factors.

"But I don't know the real solution yet—I must think it over!" adds Capt. Eckersley, with characteristic candour!

"WATERLOO"

A Burlesque
by
LANCE SIEVEKING

The recent broadcast of the historical play "Waterloo" apparently shocked several listeners because the Duke of Wellington and other characters were made to say "damn," etc., etc. The authors decided to enlist the help of Mr. Lance Sieveking, and the following condensed version of "Waterloo"—which will probably have been broadcast by the time this issue of "P.W." is on sale—is Mr. Sieveking's idea of how a play can be entertaining without making use of naughty words.

"WATERLOO"

In Memory of June the 18th, 1932.

(*Fade up Overture "The Wooden Soldiers."*)

SCENE: VICTORIA STATION.

(*Fade Overture into confused background of trains whistlings, porters, and all that kind of thing.*)

GRANDMOTHER (*agitated*): Dearly me! Dearly me! I know we shall miss the train.

LITTLE GIRL: Can I have some milk, Gran'ma?

GRANDMOTHER: Milk! No, child! Not a moment to lose! Porter!

LITTLE GIRL: Gran'ma!

GRANDMOTHER: Yes?

LITTLE GIRL: Why do they call this station "Victoria," Gran'ma?

GRANDMOTHER: Bless us! The child's a ninny! Have you never heard of the great battle of Waterloo?

LITTLE GIRL: Often and often, Gran'ma. I heard a play on the wireless the other day. What day is this, Gran'ma?

GRANDMOTHER: The 30th of June, of course. And your Great-great-grandmother was nearly run over at a turning point in history.

LITTLE GIRL: I know; you've told me before. But tell me again, Gran'ma, while I drink my milk.

CONGRESS SITS.

GRANDMOTHER: No, we must take a taxi at once to Waterloo Station, and from there a coach to Vienna, where the Congress is sitting. Quick!

USHER: My Lords, Your Excellencies, Gentlemen; pray silence for His Grace the Duke of Wellington.

WELLINGTON: Gentlemen; my gallant and distinguished colleague, Marshal Blücher, differs from me and His Britannic Majesty.

A DIPLOMAT: Impossible!

WELLINGTON: He does, really! But look here, all you members of this Congress, including that awfully nice man, Prince Metternich, I appeal to you. King Louis promised faithfully to pay Buonaparte a regular amount during his stay at Elba, and he has never sent even an instalment.

A DIPLOMAT: Really, your Grace, that nasty Corsican chap—

WELLINGTON (*sharply*): Your Excellency, we have made a bargain. For goodness' sake let us keep it. Let's be decent fellows about this matter, even though some of us, like Prince Talleyrand, have never been to a public school.

(*Murmur of protest. Sound of guards outside council chamber rattling their arms about. Fade up Russian National Anthem.*)

USHER: Your Highness, My Lords, Your Excellencies, Members of the Ancient Order of Buffaloes—His Imperial Majesty the Czar of Russia!

CZAR: Ah! I bid you good morning, gentlemen. I know I'm late, but it is terribly difficult for a Czar of Russia to get up in the morning.

(*Chorus of sympathy from Congress. Hurried knocking on door.*)

CZAR (*testily*): Golly! What's that, Officer of the Guard?

OFFICER: Sir?

NOT CRICKET!

CZAR: Go and see what— Good-night! It's General von Werder!

VON WERDER (*painting like anything*): Sir, Buonaparte has made a sneidy exit from Elba! (*Flash of Marseillaise. All burst into hearty laughter.*)

CZAR: Listen to this! He's landed at Fréjus—troops have joined him—he's making for Paris!

A DIPLOMAT: This is frightfully mean of him!

ANOTHER DIPLOMAT: It is war! How degrading!

A VOICE: By Jove! Napoleon is a boulder! He's broken faith!

(*Fade up and mix Austrian, Russian, Prussian, English, Scottish, and Swiss National hymns.*)

NARRATOR: And so a million men were all got together quickly to be implacably embattled against the Emperor of Elba.

(*Fade up drums.*)

2ND NARRATOR: And so, on March the 7th, Napoleon arrived at Grenoble, where French royalist troops were ready to bar his way.

(*Fade up excited crowd.*)

A FRENCH VOICE: Houpla! It is the Little Corporal!

ANOTHER FRENCH VOICE: Ma foi, it is the Man!

A WOMAN (*passionately*): Vive l'Empereur!

DECIDED RELUCTANCE.

OFFICER: Stand back, please. Soldiers, you must get in his way! Remember King Louis!

SOLDIER: Ma chapeau! I cannot obstruct him!

ANOTHER: Ma tante sacrée! Nor will I. (*Outburst of cheers.*)

NAPOLEON: Mes enfants! I knew it would be all right. Put on again the tricolour cockade. Here are the eagles you followed at Ulm, at Austerlitz, at Hastings and at Flodden. Rally round me, and we will march upon the enemies of France!

(*Fade up Marseillaise strong, Fade down into "British Grenadiers."*)

WELLINGTON: What's that?

ORDERLY OFFICER: A letter, your Grace.

WELLINGTON: Bother! Tear it up.

(*Knock on door.*)

ORDERLY OFFICER: Colonel Oliver Cromwell and Cardinal Wolsley to see you, and Lord Uxbridge.

WELLINGTON: I cannot imagine how you got here, gentlemen, but we must stop the ball at once and march to the field of Waterloo, where I hear Napoleon is reviewing his troops.

CROMWELL: Eet is all a mizdake, your Grace, I am nod Gronwell. I am Baron von Muffling.

WELLINGTON: Von Muffling! What a funny name!

MUFFLING: I gom from Marshal Blücher. You gan gount upon his support.

WELLINGTON: Goot! I mean "Good"! Now give orders to everyone to rejoin their units in their dancing pumps, and, by Gosh! to get knocked over in the mud in 'em if need be!

ORDERLY OFFICER: Jawohl, your Grace!

STANDING ORDERS.

UXBRIDGE: Our men are standing from Namur to Liège, quite sixty miles.

WELLINGTON: Yes, that's jolly risky, Uxbridge; tell 'em to sit down.

(*Fade up French March and down—Silence.*)

NARRATOR: The same evening in the French camp.

GOURGAUD: Sir, Marshal Ney has come.

NAPOLEON: Bring him in, Gourgaud. Ah, Ney, tell Marshal Soult not to let Wellington and Blücher meet. That would never do!

NEY: Sir, it will be frightfully difficult! The soldiers are so tired, and the rain—

NAPOLEON: I count on you, Ney. We attack at half-past eleven.

(*French March up and down.*)

NARRATOR: While in the Prussian Headquarters...

(*Up Prussian March and down.*)

GNEISENAU: I dell you, Grollman, we must fall back!

GROLLMAN: But, Vellington!

GNEISENAU: I don't care! Blücher fell off his horse again yesterday!

(*Door bursts open.*)

BLÜCHER: Nonsense! I am all right. We will move on Waivre at once, and support Vellington as I promised.

(*Fade up marching feet. Silence. Several horses are heard moving.*)

HILL: The rain is coming on again, sir.

WELLINGTON: I'm glad I kept my umbrella. I hate getting wet.

UXBRIDGE: We shan't be long now. I hope Buonaparte will deliver a frontal attack.

WELLINGTON: Too much to hope for! But I've put the guns on the crest of the ridge, and the infantry behind the bushes, so that he can't see them. Pity Blücher got the bird at Ligny!

UXBRIDGE: You count on him?
WELLINGTON: Rather! He'll play the game! A white man, old Blücher!

(*French bugle-call.*)

SOULT: I can see the English, sire. They fight well, the dirty pups! They're tough eggs!

NAPOLEON: Bosh! Because you have been beaten by Wellington you regard him as a red-hot General!

REILLE: The English infantry are invincible, sire.

NAPOLEON: Oh, do shut up! We sleep in Brussels to-night, as I've told you. I have sent Grouchy with 33,000 men to give the Prussians a good ticking-off. They cannot join the English!

SOULT: It's nearly half-past eleven.

NAPOLEON: All right. When I say "Go," go!

PRUSSIAN BLUES.

NARRATOR: For hours and hours, all the armies hung about; Blücher and his Prussians getting terribly muddy in the wet lanes.

(*Distant clock strikes eleven. A horse gallops up.*)

WELLINGTON: You seem in a jolly awful hurry, Uxbridge! Your horse is perspiring like one o'clock!

UXBRIDGE: Buonaparte is reviewing his troops. We shall see him in a minute. We want to have a shot at him. By the way, the officer in charge of the Rocket Battery is blubbing frightfully at your order to distribute his men among the artillery!

WELLINGTON: The little beast! Tell him to do what's he's told. Ah! there is Napoleon!

UXBRIDGE: So he is.

A VOICE: There goes Boney, the little sneak!

ANOTHER VOICE: What a tummy he has!

ANOTHER VOICE: Note the corporation! He carries all before him!

(*Fade up distant strains of French Band and cheering.*)

WELLINGTON: This is the beginning, gentlemen. They're off!

(*Swell up cannon fire and fade.*)

NAPOLEON: What? The Prussians? Impossible. I told them not to come!

SOULT: But it is them!

NAPOLEON: Oh, bother! The main infantry attack must go forward at once and shoot off heaps of guns!

SOULT: Sire, I will see to it. (*Up heavy cannon fire. Trumpets. Shouting. French bugles.*)

HILL: Here come their infantry!

WELLINGTON: Steady, lads! (*quietly*) It's all going well. The Greys and the Inniskillings are behaving beautifully. If only Blücher would come!

HILL: Ooh! My! Here comes the French cavalry! Wellington: Bother! Just look at that. They're being frightfully rough!

UXBRIDGE: There's Blücher and the Prussians!

WELLINGTON: How ripping! I knew he'd come!

(*Swell cannon fire and fade.*)

A FAMOUS VICTOREE!

NAPOLEON: All this charging will ruin me! I've no cavalry left, Ney!

NEY: We cannot break the English square, sire.

NAPOLEON: C'est magnifique, mais ce n'est pas la guerre! Forward the old Guard!

NEY: I hate this battle.

NAPOLEON: Charge!

(*Tremendous gunfire, shouts, National Anthems and bugles.*)

WELLINGTON: Stand fast, men! We must not be beat! What would they say in England?

A SOLDIER: Righto, Guv'ner!

(*Up Marseillaise—guns—cannons—musket fire—shouts.*)

WELLINGTON: Stand up, Guards!

(*Pause.*)

(*English bugles, cheering, guns, cannons, rumbles, thunder, lightning, National Anthems, marching feet and horses galloping.*)

(*Silence.*)

TIME STANDS STILL.

NARRATOR: With the repulse of the Old Guard, Napoleon threw in his hand, and gave himself up, and was taken in a ship to St. Helena.

(*Fade up sea-wash—gulls, and sharks.*)

NAPOLEON (*acarily*): What time is it, Bertrand?

BERTRAND (*ceeping*): Five o'clock, sire.

(*Pause.*)

NAPOLEON: What time is it now, Gourgaud?

GOURGAUD (*weeping*): Five o'clock, sire.

NAPOLEON: We have been on St. Helena two long years, Bertrand, and it is still five o'clock.

BERTRAND (*convulsively*): I know, sire. It gives me a pain in the neck!

NAPOLEON: And me, Bertrand.

(*Up bugle, playing "Last Post."*)

NAPOLEON: We must complain about that bugle. It makes me ill.

BERTRAND: If only we hadn't gone to Waterloo!

NAPOLEON: Ah! If! If! If! But the men of 1932 were not those of 1815. What time is it, Gourgaud?

GOURGAUD: Still five o'clock, sire!

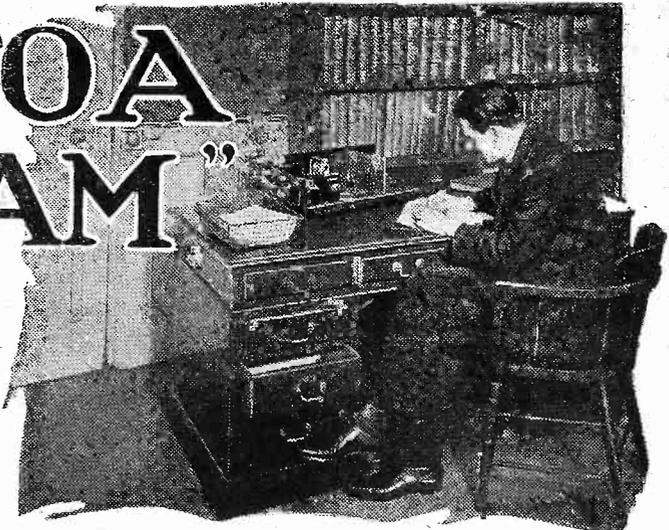
NAPOLEON: That clock must have stopped. It is fate!

(*Fade up gulls and sea-wash.*)

THE END.

LETTERS TO A YOUNG "HAM"

by ARIEL



There's a shock for "young Horace" this week. Instead of the nine-valve super-het. he was expecting from his "uncle," he gets—some good advice! But "Uncle Ariel's" words of wisdom are well worth reading, as you will agree when you have perused this week's letter.

My dear Young "Ham,"

So you have passed the "Oxford Local"! Congratulations! When I think of that and then think of your dad, I realise that the age of miracles has not yet passed.

I hear from your Uncle Timothy that you now propose to drop Yo-Yo and toy trains and, with my assistance, to take up radio seriously as a hobby. I wondered why the old brute chuckled so fruitily, till he let out that you were confidently expecting me to supply you with a nine-valver.

Now, look here, young Snock-Portle, you are going to get the biggest knock you have taken since I refused to buy you that suit of armour which we saw in the Tower of London. Nine-valve *nothing*.

An Apprentice to Radio.

When the apprentice first goes to sea he does not command the *Mauretania*; he commands a lot of school books, a lot of brass-cleaning rags, and—if he is wise—his tongue and his temper.

You are only an apprentice to radio, with a whole headful of great ideas—which, one by one, I shall most cruelly slaughter.

The first victim is the notion that with nine valves and a rich uncle—you *think* he is rich—you can just lay back and hear Melbourne and then go and hurl your weight about amongst your fellow-students at the Merchant Explorers' School. I've a good mind to give you a cheap hydrometer and make you take the Sp.-Gr. of battery acid for a month, just to tame you.

But I won't! Because you are the son of your mother, I'm going to let you into the first great secret of engineering—and the building of a receiver is light engineering—which is that for the engineer there is but one thing to be striven for. *High efficiency!*

Efficiency is the Key-word.

What is efficiency? For you it ought to mean the ratio of input to output; in other words, you should try to get the best results in the cheapest and simplest way.

You can take a walnut to a steam hammer to be cracked, but the method is not *efficient* in the engineering sense. You can run your radio set from Leclanché cells, but the method is not *efficient*.

On the spending side you want the least possible capital expense, time, effort and cost of upkeep; on the getting side you want the greatest possible return and the best possible quality. So what would *you* be after, with your nine valves and a mahogany console?

Put that in your pipe and smoke it. Next, we will ask ourselves what your real object is when you take up radio.

I have not the slightest doubt that by the aid of working prints you could put together a complicated nine-valver and sling a lot of wonderful jargon at me—just like the parrot at Dr. Brodie's in the High Street, who can diagnose a case, though it's always the same one.

Yes, and you could continue to repeat the process till you developed senile decay—

HAVE YOU HEARD HIM?



Here is the short-wave station W I Y U, which is operated by students of Yale University. It transmits experimentally on various waves around the 20-metre and 40-metre bands.

like your Uncle Timothy. But you wouldn't. You would tire of it in a year; neither your pocket nor your patience would stand up to such "dull, mechanic exercise."

I'll tell you what is the proper foundation of radio as a hobby. It's the experimentation with *different principles*.

Anyone can find out *what* to do, but your business is to know *why* you do it.

I want you to look at the matter something like this: "Here is a wonderful medium which bathes the whole earth—the ether. Here are some little bits and pieces of wire and what-not. Combining all of these, I can receive intelligence from practically every country in the world.

"Discover Some New Trick."

"I am going to keep on shifting the bits of wire and what-not around till I am master of all the most efficient combinations thereof"—and, if you like, you may add: "and perhaps discover some new trick, and, incidentally, impress pa and ma and that kid sister of 'Stinker' Jones, who has such a lovely hoist at netball."

Beware, oh, beware, of mere noise! To put a station on the loudspeaker is not particularly heroic. The valves and batteries do that; it is not necessarily a point to *your* credit. Remember always that what one fool can do another can.

In the little room, the first on the right off the bathroom landing, where they keep your pram, your poor ma's bicycle—she hasn't been on it since 1912—and the holiday trunks, you will find about £25 worth of wireless junk. Ask the pater to let you—er—clean it up.

It should comprise the makings of a very fair three-valver. Let me see what you can do with these components next month. No, keep away from short waves and confine yourself to Europe for the time being.

A 2-volt accumulator will be delivered at your house in a day or so, as a memento of the "Oxford Local," and Jimmy, your cousin, will bring round a pair of H.R. telephones and some wire and things. I enclose five bob—half from your Aunt Sophonisba and half from me—for miscellaneous expenses. Get busy—and then we'll see!

Beware of Mere Noise!

I hear that you have a new sister, aged nineteen hours. Beware of mere noise! Now's the time to collar all that junk from the pater. He'll say "Yes" to any request the granting of which is likely to keep you off that infernal one-string fiddle.

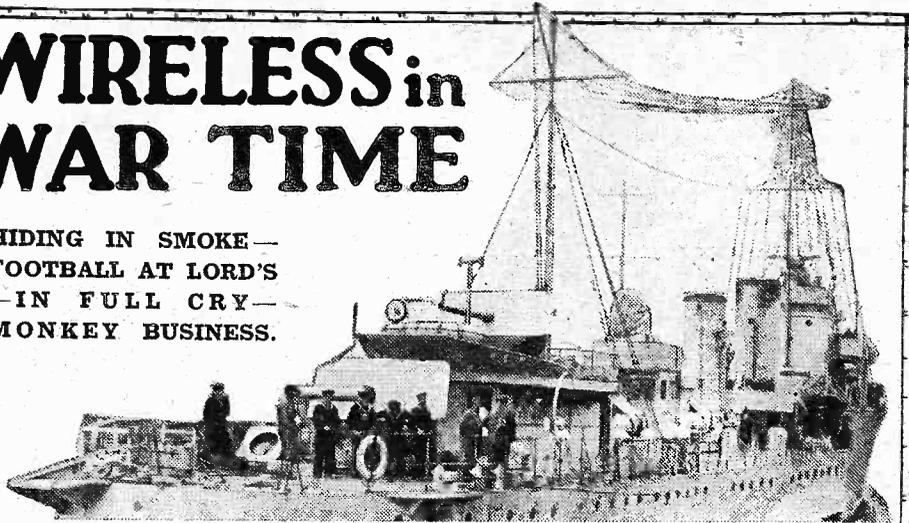
Yours respectfully,

UNCLE ARIEL.

P.S.—Snoodles is home from the vet's and has got over the distemper. He wants to see you on Sunday and show you the assegais I brought home from Zululand. They are sharp—and poisoned! Come early or the cake will have "faded."

WIRELESS in WAR TIME

HIDING IN SMOKE—
FOOTBALL AT LORD'S
—IN FULL CRY—
MONKEY BUSINESS.



Extracts from the Diary of a Wireless Operator at Sea, 1916-1918

AUGUST 28TH, 1917.—Very fine weather and a brilliant moon at night. The convoy has closed in and we are now very much nearer to each other. The gunners are continually on watch; in fact, there are double watches on the bridge and in the crow's nest. On the poop we have prepared four smoke cowlings containing some concoction of phosphorus. When water is added, clouds of smoke belch forth from the cowlings and hide the ship (perhaps!) from the submarines, etc.

A Good Night.

AUGUST 29TH.—Last night was a good night for wireless. I heard the Commander-in-Chief of the Spanish Army issuing war orders from Madrid, though heaven knows what he's got to issue orders about! Tuning a little more, I heard Gibraltar sending code to Whitehall, Cadiz, and Las Palmas.

All had something to say to the Spanish battleship, Alfonso 13th. Later, on a longer wavelength, there was Rinella (Malta) sending out a Government war warning, and at 11.30 I tuned in Poldhu for press. At 11.45 came a time signal from the Eiffel Tower, Paris, and as the night grew older and atmospheric conditions improved, dozens of messages clicked in my telephones—code signals from the Grand Fleet, German lies from Nauen, and German orders in code flashing to Constantinople and Damascus.

World-shattering News!

There were private messages from Madrid to Berlin, and dozens of other stations could be heard, some faint, some loud, some impatient, some lethargic—but all clicking away in the phones and keeping me busy noting them in the Log Book. In truth, a wonderful night for wireless.

SEPTEMBER 1ST.—The weather has turned cold and rainy. Heard with profound regret that the Lord's Cricket Ground had been used for football for the first time in 200 years. Breakfast topic: What effect will this have on the war? We have been reinforced by six American destroyers.

SEPTEMBER 3RD.—More excitement. A few minutes ago the third officer yelled out: "Stand by, gunners." Well, we all know what that means. I ran out of my cabin to

see the sport, if any, and as I did so one of the destroyers fired—at what, I could not see.

But there was a swirl of water far away on the port bow, where I presume a U-boat had dived, and then—tally ho! and the Yank destroyers were away in that direction like a pack of hounds.

It was thrilling to see those destroyers tearing through the water. The foam came completely over their bows in one continual stream, and what with the quick, staccato bark of the guns it was quite enough to make one's heart jump with excitement. Later on they came back to their positions like hounds who have lost a fox. Hard luck!

Home!

SEPTEMBER 4TH.—We took leave of the Moldavia and the other ships this morning. They wished us "Cheerio," and we went on to Cardiff.

SEPTEMBER 6TH.—We docked yesterday, and I have been lucky enough to get six days' leave—a pleasant conclusion to a six months' trip.

OCTOBER 10TH.—We left Milford Haven this morning in a convoy of twenty ships. Our average speed is about ten knots. The weather is vile—the wind blowing a bad-tempered gale, and the sea very rough.

We are bound for Mesopotamia again, with troops and military stores. The latter consist of railway engines, aeroplanes, motor launches, motor transport waggons, etc. I felt none the safer for knowing that beneath the after-hatch there are several hundred tons of T.N.T.!

OCTOBER 19TH.—We arrived in Gibraltar

early this morning, minus the rest of the convoy, which we lost on the way owing to bad weather.

While ashore, I had a long talk with a Spanish agent, who told me many interesting odds and ends about life on the Rock. It appears there is one man responsible for looking after the gates which separate the neutral territory from Spain and Gibraltar. If anything untoward happens, he is liable to be shot offhand.

Another curious fact is the presence of monkeys on the higher slopes of the Rock. It is curious because there are no monkeys in Spain, and it is thought that they must know of a secret passage under the sea connecting Africa and Gibraltar.

A Fine Aerial.

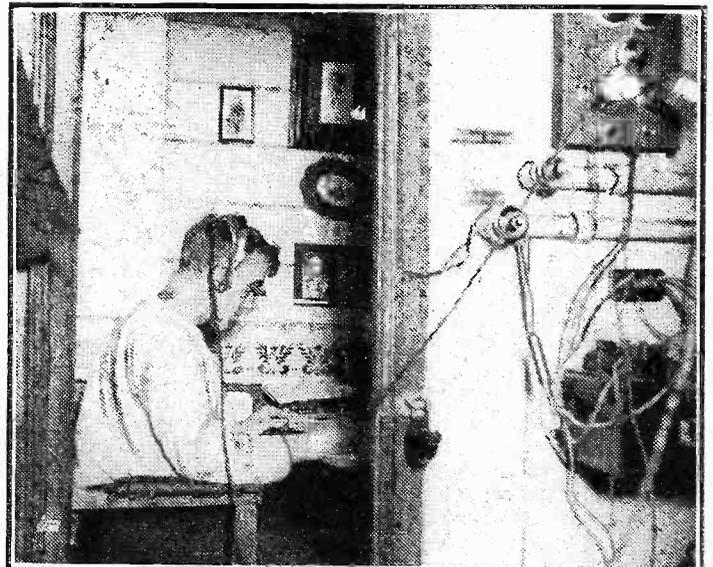
There are two wireless stations at Gibraltar, one at Europa Point, and one at North Rock. The latter has an aerial wire stretching from the very top of the Rock right down to the ground. It's one of the finest natural aerials I've ever seen.

OCTOBER 21ST.—We dropped anchor in the harbour of Oran at 9 this morning. Our next place of call is Algiers. We are dodging about from port to port like this because submarines are extremely active just now, and we do most of our travelling by night.

OCTOBER 23RD.—Algiers. This is a splendid city lying in a beautiful bay that reminds me of Naples. Tall hills form a background, and the whole place is extraordinarily well laid out.

Going ashore, I found all as gay as a sea-

SOMEWHAT CRAMPED QUARTERS!



Here is a wireless operator photographed in his "cabin" on an armed trawler during the war. The restricted space in such a vessel makes accommodation very limited for everyone, but the unfortunate W/O hardly has room to turn round!

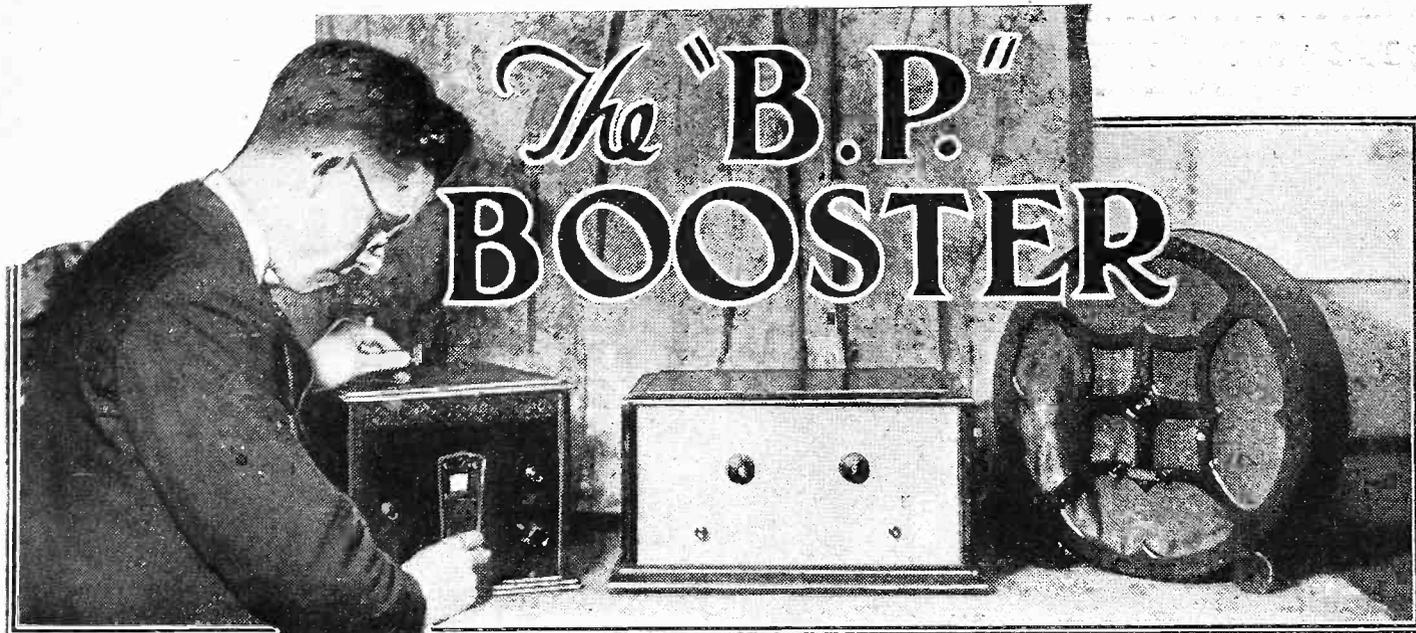
side resort—not in England, of course. A casino lured my unsophisticated self inside. "Faites vos jeux, Messieurs."

To cut a long story short, I lost about thirty francs.

OCTOBER 24TH.—We arrived in the little bay of Bougie at 7 a.m. This is quite a small place and some twelve hours steaming from Algiers. We leave for Bonar at 6 p.m. This travelling at night time has its compensations, for I get all day off duty.

(To be continued.)

The "B.P." BOOSTER

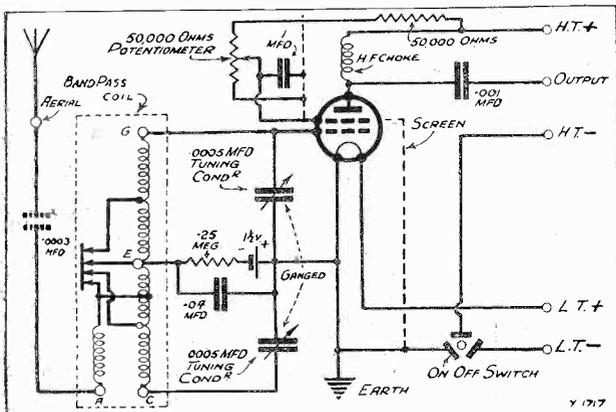


SOME sets bring in two transmissions at once — transmissions that cannot be separated, no matter how the controls are "juggled." Others require the last ounce of reaction to bring many of the distant stations up to decent strength, and

Is your set one of the det. and L.F. type? If so, this ingenious unit will work wonders with it. More power, greater range and increased selectivity—that will be your reward for building the "B.P." Booster.

Described by A. JOHNSON-RANDALL.

ADD SELECTIVITY TO YOUR SET



It will be seen from this circuit that the unit comprises a complete stage of S.G., H.F. amplification, with band-pass tuning. The output terminal connects up to the aerial terminal of your set, and you can use the same batteries or mains unit for receiver and "Booster."

even then give results that are poor, because by pushing the reaction to the "last limit" the reproduction has become woolly and the tuning so critical that the smallest movement of any of the controls causes the transmission to fade out.

There must be hundreds—probably thousands—of such receivers in use at the present time. Most of them are of the detector and L.F. type, employing either two or three valves.

Easy on the Pocket.

Some of them are designs which were produced before the other reached the chaotic state which exists these days.

I frequently receive letters imploring me to suggest some method of improving the selectivity of the unfortunate writers' sets. They would like to build a modern S.G. design, but it is often a case of "pocket not permitting" unless the existing parts can be used up—a procedure which, in

general, is not possible because, normally, the tuning components would be entirely different.

And there are also those correspondents—lots of them—who require some simple means of increasing the range of their receivers without scrapping or altering their present circuits.

Greater Range.

There is a solution to the problem and it is possible to achieve high selectivity and greater range without having to construct another set.

The "B.P." Booster has been specially designed to

is a straightforward det. and L.F. or det. and 2 L.F. I do not think you need have any doubts as to the suitability of the "B.P." Booster.

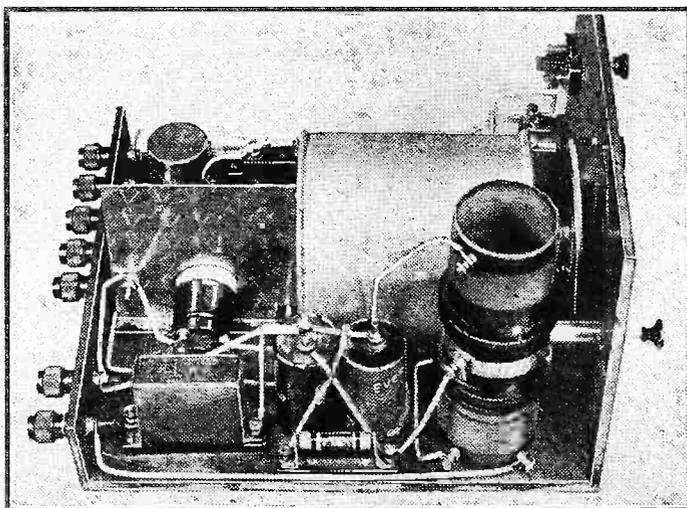
Small H.T. Consumption.

It will add only one extra tuning control to your existing equipment, since the two sections of the band-pass condenser are "ganged."

The anode current consumption of the S.G. valve has been cut down to a minimum by the insertion of a small biasing cell which applies a negative bias to the grid of the S.G. Consequently the current taken from the H.T. battery over and above that already required by the set is almost negligible. It works out at approximately 2 milliamps in the case of a 2-volt S.G. valve of the type specified.

(Continued on next page.)

IT GIVES REAL 9-k.c. SEPARATION



This view shows the special band-pass coil with built-in wave-change switch. The windings of this coil are balanced up in such a way that with a .04-mfd. coupling condenser 9-kc. separation is obtained.

of these listeners. It is a simple and inexpensive high-frequency amplifying unit embodying a very effective dual-wave band-pass tuner.

The addition of the unit to a det. and L.F. receiver will give the set a new lease of life by bringing it into line with the latest S.G. designs and thus save the cost of a new receiver.

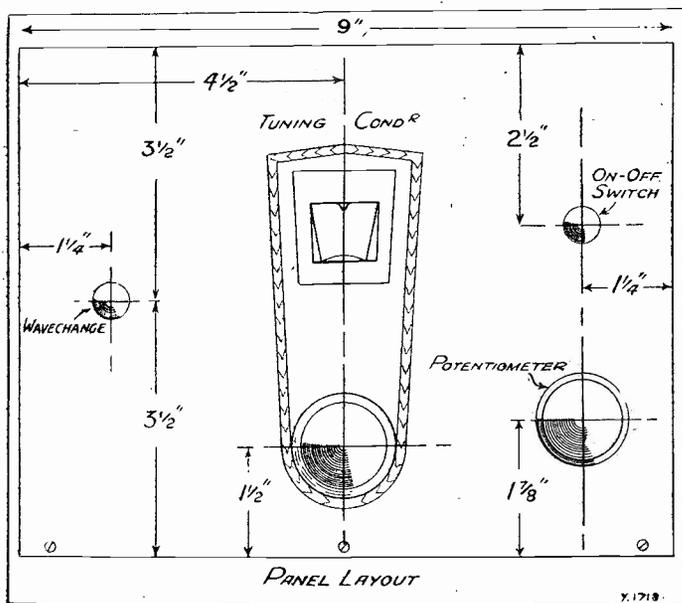
The unit can be used in conjunction with practically any receiver, provided it does not already incorporate an H.F. stage. If your receiver

THE "B.P." BOOSTER

(Continued from previous page.)

When the panel and terminal strip are ready they can be secured to the baseboard and the components mounted in the positions shown in the panel layout and wiring diagrams.

HERE ARE THE DRILLING DETAILS



Full details for drilling the panel are given in this diagram. Although the tuning knob and escutcheon look somewhat complicated, it will probably surprise you to know that three holes only are required.

The positions for the "ganged" tuning condenser and the band-pass coil are decided by their panel controls, viz., the slow-motion device and the wave-change switch.

Both of these components must be placed so that the two control spindles are correctly aligned.

At the back of the "gang" condenser, you will see a screen. This is a small aluminium or copper shield through which passes the S.G. valve. The screen can be permitted to make contact with the casing of the gang condenser, because both of these are joined to L.T.— and earth.

It is a simple screen and can quite easily be made at home from a piece of sheet copper or aluminium. The only difficulty here is cutting the hole for the valve, but this is not by any means insuperable.

One end of the 50,000-ohm spaghetti resistance is screwed to the wooden baseboard. This serves as an anchorage and also for connecting the resistance to the lead going to the potentiometer, which is clamped down under the screw head so that it is held firmly in contact with the loop at the end of the spaghetti.

The Wire for Wiring.

Now we can proceed with the wiring-up. This can be carried out with No. 18 gauge tinned copper wire in systoflex sleeving, or with one of the insulated connecting wires such as Glazite.

The marking on the band-pass unit precludes any possibility of error in connecting up this component, and the lettering will be found on the metal band encircling the coil.

With regard to the "gang" condenser,

the letters "F" and "M" on the wiring diagram stand for "fixed vanes" and "moving vanes" respectively.

Only one connection to the moving vanes is required, because the two sets of vanes are joined to a common spindle. The flexible wire marked "To Anode of S.G. valve" is connected to the terminal on the bulb of the S.G. valve.

The G.B. battery is a standard 1 1/2-volt dry cell and care should be taken to see that it is connected up the right way round. The terminal in the centre of the cell is positive, and the tag at the side is negative. Negative goes to one side of the .25-megohm resistance.

When the wiring is completed the unit can then be connected up to the set ready for the preliminary try-out.

Common Batteries.

I am going to assume that you will be using common L.T. and H.T. batteries, because this has a bearing upon the terminal connections.

The aerial and earth leads are removed from the existing receiver and transferred to the "Aerial" and "Earth" terminals on the unit. "Output" on the unit is

joined to the aerial terminal on the set.

H.T. + on the unit is connected to the H.T. tapping in the H.T. battery, giving a value of 100 or 120 volts.

The L.T. + and L.T. — terminals on the unit are joined to their respective terminals on the L.T. battery or on the set.

Earth Connection.

H.T.— on the unit is not joined up when a common H.T. supply is employed and this terminal is only provided to meet those cases where a separate H.T. battery is used to supply the S.G. valve in the unit.

If a D.C. mains unit is employed the earth connection is, of course, taken direct to the special earthing terminal on the mains unit as before.

In cases where a separate H.T. battery is used for the unit, the H.T. + and H.T. — terminals are joined direct to the battery.

In the majority of instances the same batteries will be employed for both the set and unit.

Now for some hints on how to operate the "Booster."

You will already be acquainted with the dial settings on the existing receiver required to bring in certain transmissions which you are in the habit of listening to. Take, for example, your "local" on the medium waveband.

Adjust the controls on the set to receive this station and then turn your attention to the unit.

Operation and Adjustment.

Pull the two switch knobs on the panel towards you, thus switching on the S.G. valve and placing the band-pass coil in the medium-waveband position.

Rotate the potentiometer knob so that the slider is approximately half-way round its travel, as in the wiring diagram.

Then adjust the tuning control until you hear the "local" station.

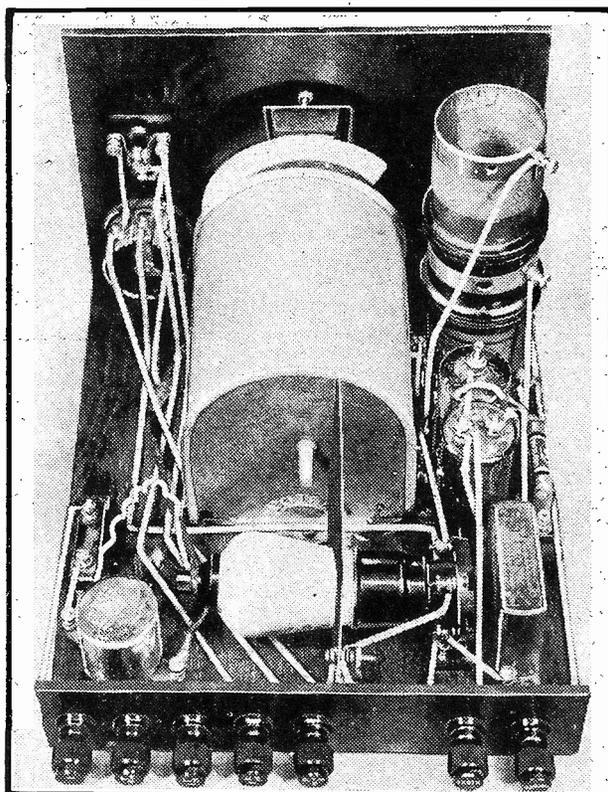
You can now re-adjust the potentiometer to the position giving the best volume. The unit is switched over to the long waves by pushing the wave-change switch knob towards the panel.

The potentiometer in this unit controls the voltage on the screening-grid of the S.G. valve, and with some types of S.G.'s a given setting of the knob may cause the valve to oscillate. This is quite normal, and can be remedied by re-adjusting the knob, and therefore the screening-grid voltage.

Lastly, a few words about the ganging. On the side of the "Polar" condenser unit will be found two small star wheels which can be rotated with the aid of a pencil or stick. These are the trimmers, and enable the two tuned circuits to be accurately matched.

To carry out this adjustment tune in a weak station and rotate the trimmer wheels a little at a time until you find which setting gives the best volume.

COMPLETELY CANNED CONDENSERS



The two-gang condenser is totally enclosed in the metal can seen here, and besides effectively screening this vital component, it assists considerably in separating the anode circuit of the S.G. valve from the rest of the unit.

NOTES FROM THE NORTH

"The history of North Regional programmes is a history of spasms," says the writer of this article, in which he criticises the Moorside Edge programmes for lack of continuity in development and for failure to redeem their promise to "reflect" the life of the North.

By OUR NORTHERN CORRESPONDENT.

IN Scotland the B.B.C. is promising great things as a result of the opening of the new transmitters at Falkirk. How far will promises be redeemed?

Similar high hopes of great local programme achievements were aroused in the North of England when the Moorside Edge transmitters came into action more than a year ago, but I must confess to some feeling of disillusionment when I think back to those hopes.

Much of what the North Region has done it has done well. My complaint is that it has not done enough.

Talent and Industry.

B.B.C. officials themselves encouraged the idea that North Regional programmes in future would be characteristically Northern; they stressed the individuality of the North-countryman; they said that not only was his speech different from the Southerner's, but he had a temperament, a mode of life, artistic and intellectual tastes, peculiarly his own.

These Northern characteristics were to be stressed in the North Regional programmes. The Moorside Edge transmitter was to be the Voice of the North, not simply a broadcaster of Northern bands and singers, but a medium through which all this Northern culture and temperament would be expressed.

A year's broadcasting has proved that the North of England possesses abundant talent, and Mr. Liveing and his colleagues have worked most industriously and successfully to bring all good-class performers and performances to the microphone. But this does not give the programme a strong Northern identity.

The advance details which have been sent to me from Edinburgh of Scottish Regional programmes show that these programmes are to be essentially Scottish in character. If these plans are anything to go by, the Scottish Regional programmes will, above everything, be programmes of a local flavour.

The North Regional programmes are primarily an alternative provided by Northern artistes to the programmes which come from London.

Absurd Trifles.

Now and then, by talks, plays, and feature programmes, some effort has been made to justify all the talk about broadcasting as a reflection of Northern life, but the job has not been tackled boldly, and consequently broadcasting in the North of England today does not hold that high place in Northern life which we optimistically expected.

A notice recently sent out from Broadcasting House, Manchester, to the Press, read as follows:

"The North Regional programme tries, whenever possible, to reflect the life of the North, and on June 7th when the new Town Hall at Morecambe and Heysham is opened the microphone will be there in order that

the speeches by the Lord Mayor of London and the Mayor of Morecambe and Heysham may be available from the Civic Luncheon."

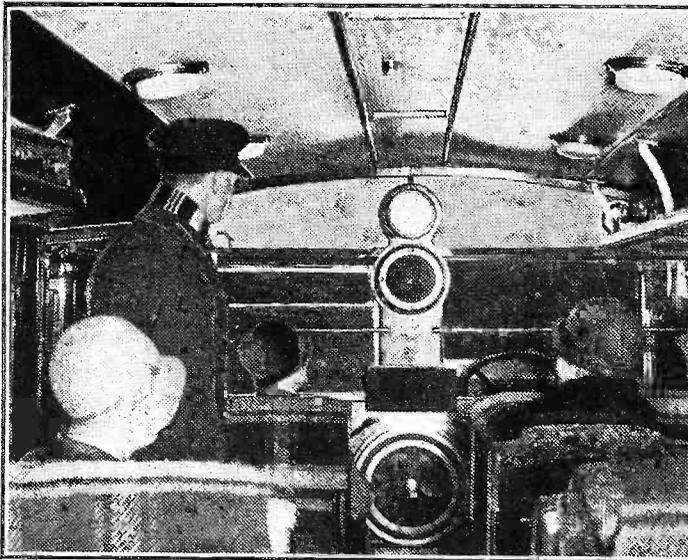
This is not the first time that the B.B.C. has served up such trifles with the absurd claim that they reflect the "life" of such a vast and active province as Northern England.

Only Rare Attempts.

I feel that if they applied themselves seriously North Regional officials could make their programmes a great influence in the North, for on the rare occasions when some effort has been made (for instance, when a series of talks was broadcast by typical Northern workers) it has been done well.

Looking at the North Regional programmes this summer, I admire the tremendous energy the Region has shown in its ambitious outside broadcast scheme

RADIO ON THE ROAD TO LONDON



This motor-bus, journeying between Glasgow and London, is fitted with a radio receiver for the benefit of travellers. The loudspeaker can be seen under the central lamp.

which is bringing so many entertaining relays from holiday resorts to the programmes. But take away the O.B.'s, and what is left?

The weakness of the North Region seems to be an inability to apply itself energetically in all directions at once. At present it is so engrossed in outside broadcasting that studio programmes of a type which demand considerable research and preparation, such as plays and feature programmes, are practically non-existent in the North.

The history of North Regional programmes is a history of spasms. The Yorkshire Mummies and Lancashire Mummies Concert Parties were launched with a great flourish and a statement that they would broadcast alternately every fortnight. After two or three appearances the Lancashire Mummies fizzled out.

A new party called the Micro-pierrots was established as a permanent organization at Manchester—gave one performance, and has not been heard again.

Some time ago there were relays from theatres at Leeds and Manchester, and we were informed that they marked the beginning of increased co-operation between the B.B.C. and Northern theatres, but no additional theatres have yet appeared in the programmes. At one time there was quite a run of revues produced in the Northern studios; we have heard nothing of this sort for some time.

Instead of advancing steadily all along the line, the North Region makes "pushes" here and there at different times; there is a flourish of trumpets and a promise of a great advance, a step forward is taken, but then the centre of activity is transferred to another part of the "front."

This may be due to a weakness of organization or inadequacy of staff; or it may be owing to the financial allowance made by London to the North being insufficient to support continuous activity in all directions—music, drama, talks, feature programmes, outside broadcasting, and so forth.

Interesting News Items.

And now for a few news items. The date of the opening of the new Leeds studios is still uncertain. But it is hoped to occupy them in September.

The Eastbourne Municipal Orchestra is to play at Harrogate from July to September, and it is probable that broadcasts will be arranged.

The B.B.C. has decided not to broadcast the open-air production of "Merrie England," which is to be staged on a grand scale at Scarborough in July.

The Yorkshire Mummies will broadcast again from Leeds in July and after that they will rest until October.

An innovation at the new control-room now under construction at Edinburgh is that metal rectifiers are used to transform the A.C. power supply

to D.C. current for charging the batteries.

The rectifiers charge banks of accumulators for L.T. (6 volts), H.T. (300 volts), grid-bias (24 volts), microphone energisation, (12 volts), and relays (24 volts). These are housed in a battery room. The control-room comprises banks of amplifiers for the incoming and outgoing land-lines and for the Edinburgh studio microphones, masses of fuses and switches, relays and signal lights. The apparatus is similar to that at Broadcasting House, London, but on a smaller scale.

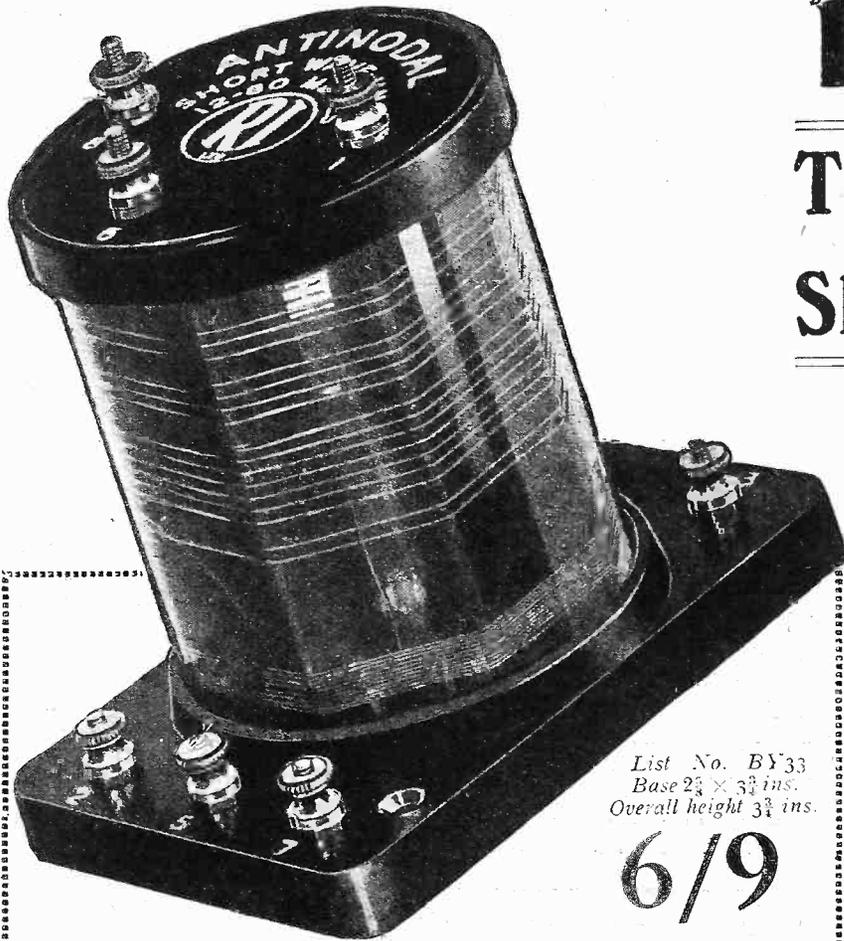
The control desks are semi-automatic, press buttons being used for most operations. Here the engineers supervise programmes passing through en route to Falkirk, and control all programmes, rehearsals, etc., in the Edinburgh studios.

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MAKE DOUBLY SURE OF RESULTS—SPECIFY

THE MIRROR OF THE B.B.C.

By O.H.M.

SITUATION IN SCOTLAND

TELEVISION PROGRAMMES—BRIGHTER TALKS—THE
B.B.C.'s NEIGHBOUR—MAGIC AND FARMING.

I HEAR that although the B.B.C. has undertaken to give the Baird Company a two years' run, Mr. Noel Ashbridge, the Chief Engineer, feels that another television system will shortly be developed. Nevertheless, Mr. Ashbridge can be counted upon to do all he can to preserve the Baird supremacy in international competition.

Mr. Kirkwood on Scotland.

I was amused the other day to hear from a friend in the House of Commons of the discomfiture of Mr. Kirkwood, the Member for one of the Glasgow constituencies. Mr. Kirkwood tried to get a question put down about the administration of broadcasting in Scotland.

But it was not accepted, so he was thrown back on asking the Postmaster-General whether he would deal with this privately. So now in addition to Sir Daniel Stephenson, Mr. Cleghorn Thomson has Mr. Kirkwood expressing the unrest of the West of Scotland.

Dingwall.

The eruptive Provost Murray of Dingwall has encountered an obstacle. It seems to me on reading all the correspondence and press notices on both sides that the going was easy until the Provost of Dingwall got himself involved in the politics of international broadcasting.

When he overstated his case, he had not only Sir John Reith to deal with but also a namesake from the East Highlands, Mr. Gladstone Murray. Well, that is the end of the story as usual.

Dorset Programme.

The B.B.C. is considering a proposal for broadcasting excerpts from a Sherborne Pageant. I hope they take it on and look for other things of a like nature, always with programme value.

Adult Education.

As one who believes in the enormous cultural value of broadcasting, may I put on record the hope that adult education as such may no longer appear in the programmes. I am emboldened to make this suggestion after looking through the Talks Schedule for the summer months—a schedule which seems to me to be admirable, chiefly because of its restraint and its entertainment value.

"Magic in the Air."

The name of Maskelyne is known one might say all over the world as belonging to a family whose association with magic has put them for many years upon a higher plane than most conjurers can ever hope to reach. Jasper Maskelyne, the present head of the house, has already taken part in a broadcast programme, and now I hear he is to appear in a radio revue, which he has himself written in collaboration with Mr. John Macdonnel, early this month.

The show is called "Magic in the Air," and although at the moment I can tell you very little about it, listeners may rest assured it will have something to do with the profession of which Mr. Maskelyne is so baffling an exponent.

Maskelyne's Theatre, near which Broadcasting House is such a newcomer, in Langham Place, has been attracting its thousands for many years to see the wonderful performances of magic. We must, in fact, go back to the 1870's to trace the beginning of the show first run by Maskelyne and Cook, and later by Maskelyne and

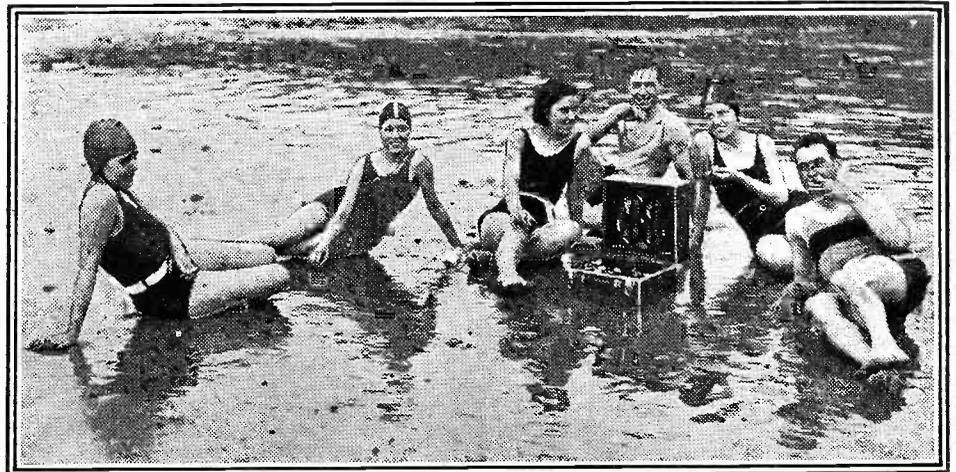
Devant, originally at the St. James's and Egyptian Halls, and afterwards at St. George's Hall, where it still remains.

A Farmer at Heart.

The original Maskelyne (Jasper's father) and Cook were jewellers' apprentices at Cheltenham, who took up magic after "seeing through" a spiritualistic performance which they afterwards exposed, and it is not, therefore, surprising that Jasper heard the call of the West Country, where he began his career, not as a magician, but as a farmer.

Ploughing, milking and smithy work are as well known to him in the practical sense as practising his illusions, and they say he only works at magic to make sufficient money to be able to retire to a super-farm where he can experiment. I do not know how well magicians are paid, but Jasper has given his stage performance five thousand times without a break.

"FURTHER OUTLOOK—FAIR AND WARMER"



They took the portable on holiday with them in case it rained all the time, and they found it such good company that first it was moved to their hut on the cliff, and then right down on the sands, to provide music for bathing. Very nice too!

THE LISTENER'S NOTEBOOK

A rapid review of some of the recent radio programmes.

I'VE come to the conclusion that certain broadcast items, like oysters, should be either in or out of season. Take the evening, for instance, when A. J. Alan returned to the National programme. Till his appearance at 10 o'clock, National listeners hadn't had a moment in which to listen leisurely; every item from 6.30 p.m. onwards had been heavy, demanding our closest attention.

Even Vernon Bartlett taxed our brains with problems of inflation and deflation, problems which the best of us can only begin to unravel. And it was a sweltering hot night, too!

This sort of thing is all right on evenings when the snow lies on the ground, but when King Wenceslas has yielded pride of place to King Sol, such fare, with sundry clouts and breakfast porridge, should be sent packing. This isn't fit entertainment for river and garden parties.

Nobody wants to hear Vernon Bartlett

solve the world's financial problems just when they are enjoying, say, a picnic supper under some overhanging willows. Such discourses sound a little incongruous.

A. J. Alan, whose fare is always seasonable, broke the spell, however. I noticed that his manner hadn't changed one little bit (and who would wish it to?), but his matter would suggest he intends to pander to the public taste for the detective type of yarn. "My Adventure at Chislehurst" was a good story, although it didn't keep us guessing long enough. But perhaps we are getting more expert.

It was a strange coincidence that Lord Pousouby should talk on "Listening and Talking" immediately after "The Pink, Pink Vase." This play was remarkable for the fact that one character—Queen Gert-rude—was allowed to dominate the whole, without being credited with a single remark

(Continued on page 512.)

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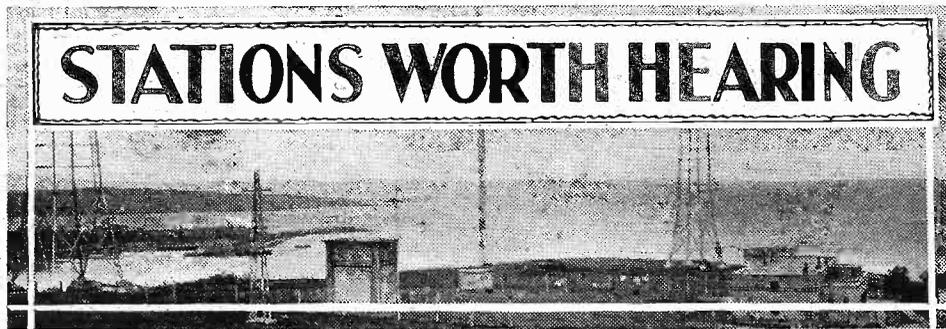
SOMEBODY (not a long-distance wireless man) said to me the other day: "Don't you find it rather dull being tied to the local station in the summer time?" I replied: "You're thinking of wireless as it was some years ago; if you want to see what it's like now come round to my house this evening and ask for any European station that you want within reason."

I explained that by "within reason" I meant that the station must have an output rating of 5 kilowatts or more, and that it must be using a wavelength free from encroachments by its neighbour. He did come. I handed him the foreign programmes for the evening, and of the fifteen stations that he named I was able to obtain good reproduction from eleven.

All-the-year-round Listening.

Subsequently I took him for a tour over the European wave-bands and he was amazed to discover how large was the number of stations coming in well enough for their programmes to be really worth listening to.

The old idea that wireless is a winter pastime dies hard, but it is dying. Once the general public realises that genuine entertainment is available all through the



STATIONS WORTH HEARING

Up-to-the-minute information for the long-distance searcher.

summer from foreign stations as an alternative to the local programmes wireless will take its proper place as an all-the-year-round hobby.

Fewer Atmospherics.

I am glad to be able to report (though I touch wood very firmly whilst doing so) that atmospherics are at last giving the long-distance man a rest. The reason, I think, why they were so bad during the latter part of May and the first part of June was that we then passed through the change from cold to warm weather which usually occurs several weeks earlier.

Summer, as we know to our cost, was long delayed this year—I saw snow in Devonshire in the middle of May. The change was therefore rather a violent one, and atmospherics might be expected to accompany it.

Superb reception of the long-wave stations continues with very few exceptions.

select the best. For reliability full marks must be awarded to Toulouse, Rome, Langenberg, Brussels No. 1, Brussels No. 2, the Poste Parisien, Hilversum, Heilsberg, Turin and Trieste. These never seem to fail, but come in at full strength whenever they are wanted.

Plenty of Programmes.

Very nearly as good are Florence, Prague, Beromünster, Sottens, Frankfurt, Milan, Göteborg and Gleiwitz.

But do not imagine that the stations so far named are the only ones worth attention. You never know what you may find just now. As an example I may mention that on a recent evening Lille was picked up at full loudspeaker strength long before dark. Other notable captures are Toulouse, P.T.T., Brno, Strasbourg and Bordeaux. The last-named station has been under a cloud for some little time, but I have heard him on several evenings lately. R.W.H.

OTHER PEOPLE'S IDEAS

Readers describe their experiences for the benefit of others, and explain their methods of overcoming various troubles.

WRONG WIRING.

The Editor, POPULAR WIRELESS.
Dear Sir,—After reading E. C. F.'s (Liverpool) letter of September 26th, I must congratulate the staff of "P.W." for the Flexi-Coupled "Comet" Three.
I had the same trouble as E. C. F. I tried new coils, .002-mfd. condensers, and other parts, but no better, and what do you think it was? I had wired up my differential wrong. The diff. is marked F1 and F2 in my case, I changed over these leads (or wires) and the set is now fine with reaction working grand. I thought this may be E. C. F.'s trouble.
Yours truly,
Gravesend, Kent. F. H. COTTON.

UNLUCKY 13!

The Editor, POPULAR WIRELESS.
Dear Sir,—May I be allowed to pass on an experience that has just befallen me? A friend's set developed a fault which I traced to a broken-down transformer (one of two metal shrouded ones, apparently cheap). Having replaced this with a new one, I set out to test the set. All seemed O.K. until I removed a G.B. plug to try a different voltage. Blue sparks!
Hastily disconnecting the set I checked all the connections, they were all right. Then I noticed that some stray ends of flex on the G.B. lead were securely fused to the metal case of the old transformer.
On removing and testing I found that the case was shorting internally on to the primary, thus a short circuit was formed when the flex touched this case,

the movement of the wire had caused it to do this. Two of the three valves are no more, and my H.T. accumulator put on the previous day fully charged now only shows half charged.
Trusting this will be of use to others.

Yours truly,
L. J. CLEGGETT.
"A READER FOR TEN YEARS."
P.S.—Has the date anything to do with it—it is June 13th?
Maidstone, Kent.

EASILY-MADE TAPPINGS.

The Editor, POPULAR WIRELESS.
Dear Sir,—Reference to "P.W." No. 521, 28th May, 1932, page 352, "Radiotorial" Query, "F.W.L. (Donnington)":
I have made several crystal sets, trying for greater volume, and I am interested in this question and reply.
Unlike F. W. L., I don't like making "tappings." I evolved a way of multi-tapping coils as per rough sketch herewith. I have found this system neat, handy and easily done.
Perhaps this would be of interest to F. W. L., and maybe other of my brother readers, if you think it worth while to use it.

I get a piece of wood or ebonite, say 1/8 in. thick, 3/4 in. broad, and length of coil wanted. I wind 4 turns (or any number wished) on the former, and lay on the ebonite strip, say 1/4 in. forward from turn 4 (or as wished).

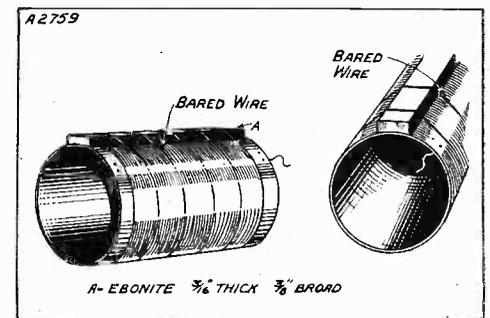
Take No. 5 turn right over the ebonite strip, and proceed winding (the next 2 or 3 turns can easily be slipped under the strip) till next "tapping" turn. Slide the strip outwards after each tapping turn.

Finally, having finished the winding, I bared the wires (i.e., the over-placed tapping turns) with a small file, and finally scorched off the "fluff" with a bunsen flame.

I find it easy and neat, and the wire is not injured by twisting into loops. I think the sketches will show the idea clearly.

Re your description in words of the wiring of the crystal set, I would much like it if you see your way to a simple skeleton diagram of the connections.

I don't like the usual crocodile dip, it is a wobbly catch.



Mr. Anderson's simple coil-tapping scheme.

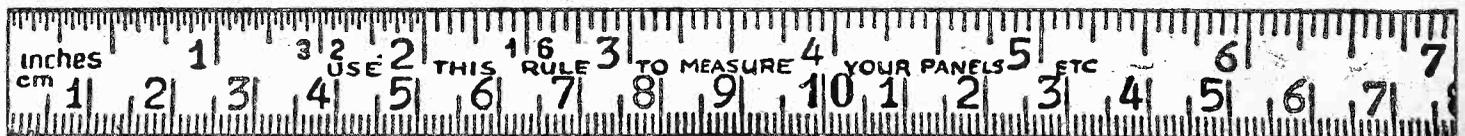
I made an improvement by filing down the end teeth, flattening the ends in a hand vice (making them rather spoon shaped). I then flattened up the little "spoon" with solder, making a better and firmer contact, with the tapped wire.

Yours very truly,
T. B. ANDERSON.
Belfast.

CHROMIUM PLATING FOR SWITCHES.

The Editor, POPULAR WIRELESS.
Dear Sir,—In your issue of "P.W." dated June 4th I noticed that F. Y. (Crouch End) asked why chromium-plated switches are not manufactured, since chromium does not stain. The reason for chromium not staining is that it stains much more quickly than most metals! This appears to be a paradox, but it is quite true since a thin, adhesive skin of oxide forms on the metal almost immediately on its exposure to the atmosphere. The oxide, of course, once formed protects the metal and renders it "stainless." Unfortunately, the oxide acts as a resistance, so that chromium is not efficient for switches.

Yours truly,
JOHN L. S. BRODIE.
Forest Gate, E.7.



CAPT. ECKERSLEY'S QUERY CORNER

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

WIMSHURST MACHINES—ABOUT ACCUMULATOR PLATES—MICROPHONIC VALVES—A CASE FOR DECOUPLING—EFFECT OF TEMPERATURE ON RESISTANCE OF LAMPS.



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

Good for the Garden.

L. B. H. (Sidmouth).—"I have a Wimshurst machine which is capable of delivering a very high voltage. Could I drive this from a small motor, then rectify the output from the above machine by the use of some form of rectifier, and use this to supply my set?"

A Wimshurst machine gives D.C.—why rectify D.C.? A Wimshurst gives D.C. at, I suppose, hundreds of thousands of volts, and with a power of one quarter gnat's leg kick!

Let's think—suppose we said that the output power was a milliwatt at 250,000 volts. Then the continuous current would be equal to one 250,000th of a milliampere, wouldn't it?—which isn't enough to work a wireless set even if you could transform down the D.C. voltage of 250,000 to 300.

No! I fear it won't do.

I once drove a Wimshurst by a motor to charge a network of wires suspended above growing vegetables to see if they grew better. I think they did grow better, but a cow got in three days before I was to weigh comparative crops, and caught its tail on the high volts and did a lot of damage.

* * *

Essential Coating.

P. R. (Hatfield).—"I understand that accumulator plates are coated with an oxide of lead. Why not use pure lead plates?"

"Surely these would be better, since they would not disintegrate? Or it is essential to coat them in this way?"

The process of making a battery, evolved through the ages as it were, is very complex, but the whole principle involves the oxidization of the plates.

The difficulty is to get the oxides to stick to the plates, and all sorts of ingenious processes are invented for just the purpose of making the oxide stick firmly. The pure lead doesn't work well, but the oxide-coated plate does.

* * *

Really Quite Easy.

M. G. (Blackpool).—"My set operates quite satisfactorily providing that it is not placed in the cabinet which I have made for it. In the cabinet it does nothing but howl and motor-boat.

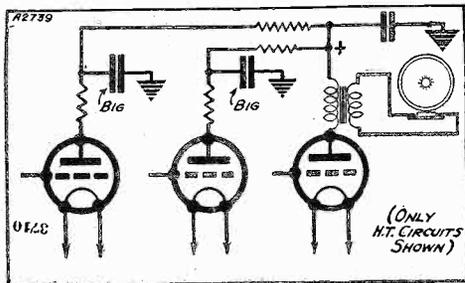
"Changing the valves has no effect whatsoever, with the result that microphonic valves can be ruled out. Is it possible that the material with which the

cabinet is covered i.e. American cloth, could cause the trouble?"

But I think the loudspeaker is mounted in the cabinet, too. Am I right? My dear Watson, it was quite easy. You see, he talks of microphonic valves. You know if you tap these they give a "pong" noise out of the loudspeaker.

Now, if the loudspeaker is quite close to the valve, the noise from the speaker—sent direct through the air or maybe sent as vibrations through the common cabinet—acts on the valve again, which makes it pong again, which makes the loudspeaker emit more pong noise, which is just the noise to which the valve is sensitive, which therefore passes it on to the speaker, which passes it back to the valves, which passes it back to the speaker. This government office (or B.B.C.) procedure continues indefinitely, and the whole set howls.

TO PREVENT MOTOR-BOATING



The fundamental cure for motor-boating is to decouple thoroughly the different anode circuits. Such decoupling applies particularly to the detector valve.

Cure? (1) Wrap up the valves in cotton wool; (2) load them with plasticine; (3) get anti-pong holders (may or may not do); (4) move the speaker; or (5) stop it vibrating the cabinet. One has a lot of choice, my dear Watson, a lot of choice.

"The Circuits are Upset."

G. B. R. (Mundsley).—"I have a four-valve receiver which has been working well for over two years. I recently acquired a moving-coil loudspeaker, complete with built-in transformer, and having removed the choke output filter in the receiver, connected the speaker transformer terminals to the anode of the power valve and H.T. +. Severe motor-boating was evident with the speaker and transformer.

It's very difficult to say categorically it is due to such and such. In general, motor-boating takes place because of retroactive couplings from stage to stage—a coupling which may be due to a variety

of causes which may act singly or together. There is a fundamental cure, and that is to decouple one stage from another. One loudspeaker works; another doesn't. Presumably, the feeds are the same. But the anode impedances are not, and this has upset the circuits. So decouple as shown in the diagram.

* * *

Not What He Expected.

J. K. (Hornsey).—"I recently arranged a small charger from my D.C. mains to charge a small 2-volt accumulator at .25 ampere, a 60-w. lamp being connected in series with the mains. I then wished to reduce the charging current to roughly .125 ampere, and therefore connected another 60-w. lamp in series with the first.

"On checking with an ammeter, I found that actually the new charging rate was not .125 ampere, and should be pleased if you could suggest where the error has occurred, as connecting two lamps or resistances in series should normally double the resistance in circuit and so halve the current."

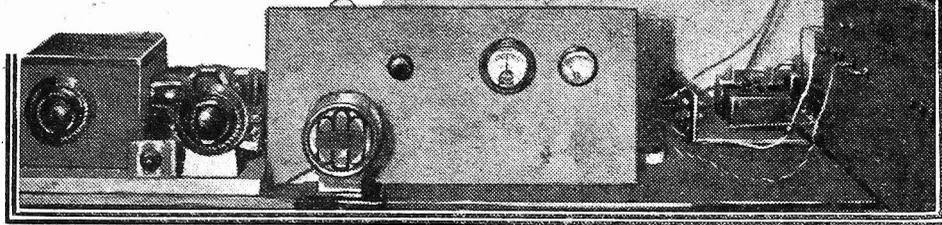
I think the explanation here is that the resistance of a lamp is proportioned by the temperature of the filament.

Thus, carbon, I think, decreases in resistance as it gets hotter, but metal increases in resistance as it gets hotter.

Calculating from your figures that you have 240-volt mains (60-watt lamp, 0.25 amp.), and that therefore the back E.M.F. of your cell as negligible, and assuming also that you had metal lamps, then putting two in series would create a less resistance than twice the resistance of one—there would be a current greater than expected.

But this greater current is not so great as to raise one lamp to its original temperature. With carbon the reverse process would occur. I am not absolutely sure about this, and the gas-filled lamps may do something funny, but my general explanation—that temperature effects resistance—is right.

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



WE must open up this week with an item of bad news. I hear from W. H. R. that the Bandoeng Tuesday afternoon broadcasts are being discontinued at once. By the time you read this they will have been "departed" for three weeks or more. W. H. R. has been told, in a letter from the station director himself, that the "bad times" are responsible for this, and that, "hoping better days are near," they may possibly resume one day.

News from Australia.

We are all sorry to lose them—those of us, that is, who have been lucky enough to be able to listen on Tuesday afternoons. Hard luck, Bandoeng!

Other news items include a suggestion that V K 2 M E is shortly going back to the old hours of 6 to 8 a.m., 10 a.m. to 2 p.m., and 5 to 7 p.m., all G.M.T. Madrid, on 30.4 metres, is asking for reports, which should be sent to Station E A Q, Transradio Espanola, P.O. Box 951, Aranjuez, Madrid. The Zeesen stations also have had a change round, and I understand that D J A (31.38 metres) takes over from D J B (19.73 metres) at 6 p.m.

I am afraid I forgot to mention that our regular correspondent, W. W. (Exeter), qualifies for H.A.C., with his list of stations heard between May 15th and 26th. Welcome to our august association, W. W.!

Letters expressing amazement at the results obtainable on one valve continue to pour in, most of them thanking me for my "Single," as described in "P.W." I can only say, in all modesty, that the results are not accounted for by any wonderful designing on my part, although I do take the credit for persuading people to give a "single" a trial.

Those of you that haven't yet done so should mend your ways, and add to the stream of letters.

Room for Improvement.

As a result of much weary work with different circuits on 5 metres I have come to the conclusion that there is still plenty of room for improvements, even with "detector-only" sets. Some weird and wonderful circuits that I have been trying show great promise. More of this later.

Inquiries from Hampshire, particularly from W. F. W. (Botley), indicate that the remarks on the one-valve from W. P. McG. have aroused some interest. The gentleman mentioned seems to be mildly sceptical, and wants to meet W. P. McG. in person. Unfortunately, the latter reader hails from

All the latest set and station news about this fascinating waveband by our own expert. Those taking up short waves for the first time, as well as the old hand at the game, will find the information of great help during sojourns on the higher frequencies.

the Knowle in Warwickshire, not Hampshire!

Our old friend, Alf Mann, of Middlesbro', is another "single" man. But he is keen on using H.F., and suggests that a neutralised triode might be useful

instead of the more usual S.G. It certainly is, A. M., but operation is a little fricky, and I don't really find it worth the trouble unless I am out after something very special.

New stations mentioned by A. M. include Stamboul (approx. 25 metres), D E Q (28.5), and D G B (19.73). I think the

W. A. L. (Choppington), with a very nice letter full of DX.

I understand that we may expect some 7-metre transmissions from Broadcasting House very shortly now, and that the B.B.C. intends to carry out intensive tests on the absorption effect of steel-frame buildings. If the wave bears any relation at all to 5 metres, reception in London should be very curious indeed.

During my 5-metre tests throughout the past fortnight I have found that a building of any kind close to the receiver constitutes a serious obstruction, but that hills or buildings at a greater distance do not seem to matter at all.

Some Queer Effects.

Using a super-regenerative affair with one stage of L.F., I have been able to drive a car with the 'phones on, and follow every word at speeds up to 45 m.p.h. Trees and buildings temporarily blot out signals, but in one direction, in which the country is flat, there have been no dead-spots at all.

My aerial is situated on the side of a gently-sloping hill, and signals are very strong indeed at the top; but as soon as one is more than a hundred yards over the crest of the hill they disappear completely, and do not come up again for four or five miles, at which distance they are terribly weak. These tests are all carried out with an aerial consisting only of four or five feet of wire slung up in the car, and probably signals could be received quite well just over the hill with a full-size aerial.

Although there are seven or eight active transmitters working on 5 metres within a radius of ten miles from my station, I can only receive one of them. He is quite strong, although to look at the map you would think he was the one station that I should be unlikely to receive!

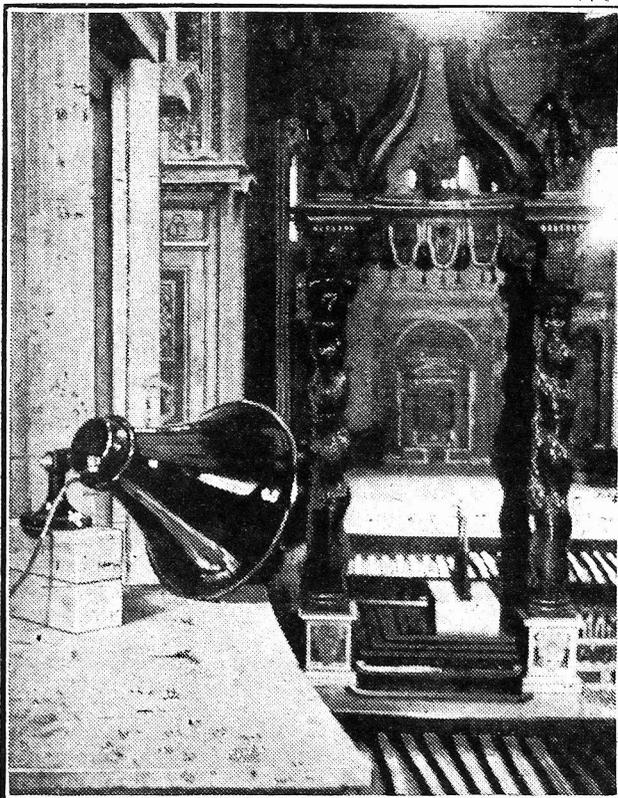
On Low Power.

Since none of these transmitters uses more than eight or ten watts, I am quite optimistic about receiving the B.B.C. 7-metre broadcast without much trouble. As a little practice in "getting down," I suggest that readers might see how many of the following active stations they can find: Buenos Aires (14.47); Rugby (14.70); Nauen (14.97); Leopoldsville, Belgian Congo (14.97)—that's a station worth getting!—and Lawrenceville (15.13).

I have heard them all myself, although Leopoldsville took me a long time and plenty of trouble.

I have two receivers for 7 metres: my ordinary set "cut down," and the 5-metre affair "grown up." It will be interesting to see which puts up the best performance. My ordinary receiver is so bad on 5 metres, compared with the special set, that there is not much doubt in my mind as to the result of the test.

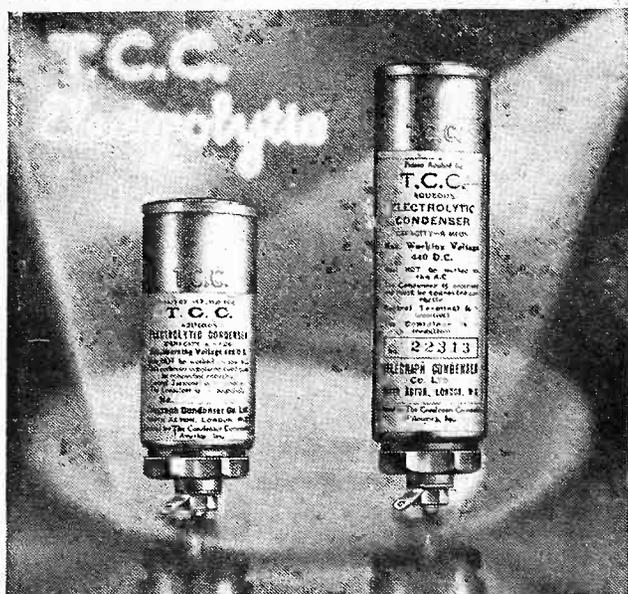
RADIO SCIENCE IN ROME



The Vatican City at Rome, not only has its own short-wave broadcaster working on wavelengths of 19.84 and 50.26 metres, but it also takes advantage of electrical amplification to enable services to be heard clearly by large audiences. One of the many loudspeakers employed is shown in this photograph.

latter should be D J B, although there may be two separate stations on that wave. A new commercial 'phone station—Cairo—on 28 metres is also mentioned.

A. M., by the way, is also qualified for H.A.C., although I should imagine that he heard the necessary six continents some years ago! Yet another new member is



Cap. Mfd.	D.C. Voltage	
	WORKING	PEAK
4	440	460
7	460	500
8	440	460

PROOF

in tangible form of T.C.C. research

IN these aqueous electrolytic condensers is seen one of the results of T.C.C.'s research in tangible form. They represent the very latest development in condenser practice—again T.C.C. lead the field—as they always have for the past 25 years.

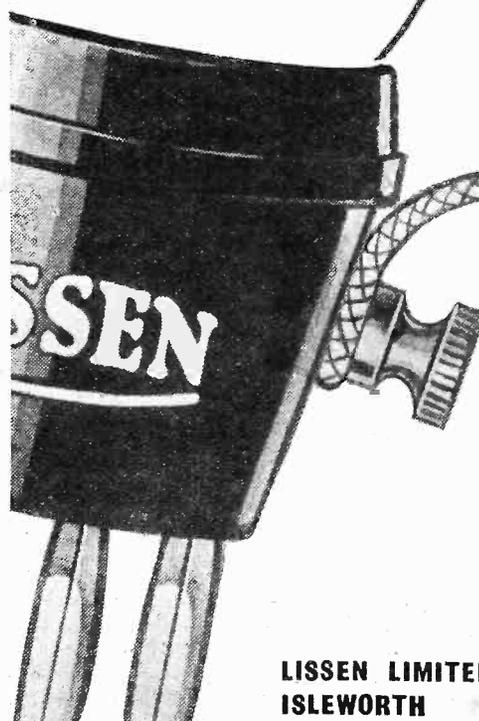
So complete is the T.C.C. organisation, with its experimental and test laboratories, its advanced manufacturing facilities, that every possible demand of the experimenter, the amateur and commercial set designer can be quickly met. A small mica condenser—a high voltage paper condenser or any condenser for a special purpose and T.C.C. are equipped to produce it. That is T.C.C.'s interpretation of service—and your assurance of a perfect product.

T.C.C.
ALL-BRITISH
CONDENSERS

The Telegraph Condenser Co., Ltd., Wales Farm Road, N. Acton, W.3

next
time -
choose a
LISSEN
Power
Pentode

12/6
P.T.
225



Replace your power valve with a Lissen Power Pentode—P.T. 225—and immediately you get a big step up in volume. Where before you got a whisper, now you get a torrent of pure sound. Yet it takes no more H.T. current than the power valve it replaces. Ask next time for Lissen P.T. 225.

Price **12/6**

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH MIDDLESEX.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found-?



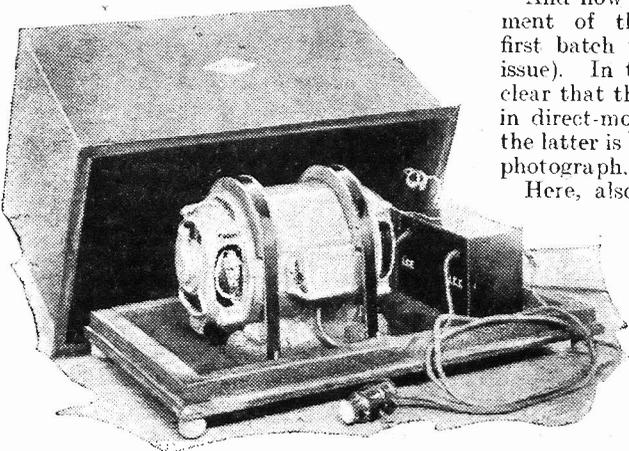
A ROTARY CONVERTER.

THE advantages of A.C. over D.C. are many and varied. Indeed, it is no exaggeration to say that many things are possible with domestic A.C. supplies which cannot be done with D.C. of ordinary household voltages.

Further, development in D.C. uses seems to lag behind and it often happens that no attempt at all is made to produce D.C. equivalents of new and intriguing A.C. apparatus.

However, it is possible for owners of

FROM D.C. TO A.C.



The Wates Rotary Converter made by The Standard Battery Co.

D.C. mains to transform their current into A.C. and enjoy the benefits of this form of supply.

The Standard Battery Co. is now making an excellent rotary converter. It is designed for a 220-volt D.C. input, and Model A is able to give an output of 80 watts at 220 volts A.C. of 50 cycles frequency. This model costs £11 10s. 0d., complete with silencing and smoothing boxes.

Model B has an output of 180 watts, and the price of this, complete, is £13 5s. 0d. Either model can be wound for certain other voltages at appropriate extra charges.

We have recently been conducting a series of tests with Model B, and these have proved entirely successful.

The machine runs very smoothly indeed and there is no vibration. The output is clean—far cleaner than many ordinary A.C. supplies.

We have employed the converter for supplying current to various instruments, ranging from simple H.T. units up to a large radio-gram embodying mains S.G. valves and an electric turntable.

In all cases the results given were, as far as the Wates Converter was concerned, quite

above reproach. There is certainly a slight mechanical hum from the machine, but if it can be placed in a different room from the set, that is no disadvantage at all, for the machine doesn't make anything like the noise which an ordinary domestic motor of the refrigerator or vacuum cleaner type generates.

We consider that the Wates Converter is a fine piece of electrical engineering, and such points as its generous-sized, completely spark-free brushes and silent bearings will command the respect of all who are able to appreciate such things.

A SECOND INSTALMENT.

And now we come to the second instalment of the Wearite components (the first batch was dealt with in last week's issue). In the first place I must make it clear that the R.D. resistance is obtainable in direct-mounting and plug-in types, and the latter is illustrated in the accompanying photograph.

Here, also, you will see the on-off and change-over types of the Wearite push-pull switches. Both are excellent components and the change-over one has an ingenious action. But I must make one criticism, and that is that it is possible for all three points to short together in an intermediate position which will hold indefinitely.

This might cause trouble; but it is a fault which, I think, could easily be eliminated.

Finally, we have the Wearite combined volume control and mains on-off switch, and this is indeed quite a masterpiece. It is a compact one-hole panel-mounting component and comprises that excellent volume control which I described last week, having built on it a switch which automatically operates at the one end of the travel of the control knob.

It is a perfect mechanical and electrical combination. "P.W." readers should ask their

dealers to let them see this component, for it is a most interesting production and costs only 6s. 6d.

In conclusion, we again congratulate Messrs. Wright and Weaire in producing such an attractive range of inexpensive, ingenious and well-made components.

PLEASE NOTE

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

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

A GOOD SWITCH.

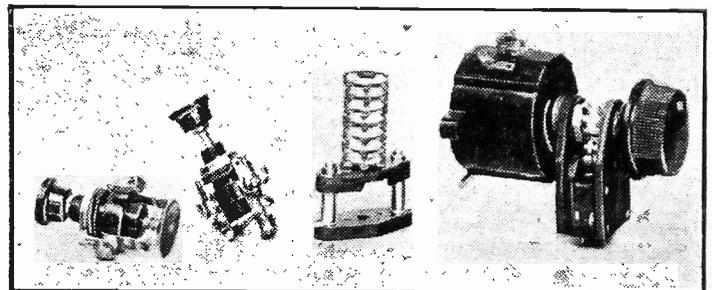
I cannot conceive of anything more irritating than a "treacle" switch. And yet there are plenty of them about. You know the kind of switch to which I refer—it has no definite "on" or "off" position and noiselessly, or even with a misleading click, slides through a "no-man's land" which may be either an "on" or "off" condition. You never know which, so that the set can quite easily be left on for a whole night because the switch has failed to do its job properly.

Bearing all this in mind, I offer a hearty welcome to the switch which George Becker, Ltd., are now manufacturing. It has a perfect "snap" action, and you cannot, however much you try, make it "stay put" at any intermediate point between right "on" and right "off."

It is a well-designed switch in other respects too, for it has large self-cleaning contacts and is of clean, robust construction. I particularly like the firmly fixed terminals and the clean moulding which comprises the frame.

My sample is a 4-ampere 250-volt type suitable for radio-grams, mains units, etc., and this last gives the clue to its satisfactory design. If all radio switches were designed to handle high voltages I don't suppose we'd ever have had those treacle ones inflicted on us!

SOME FURTHER WEARITE COMPONENTS



The on-off and change-over push-pull switches, a plug-in R.D. resistance and the combined volume control and on-off switch.



An inductor type loudspeaker is incorporated.

A COMPACT ALL-MAINS FIVE

Some interesting details of the Blue Spot W.S.400 A.C. Receiver.

THE screened-grid valve has been on the market for some time now, but it has remained for the British Blue Spot set designers to incorporate it in a commercial set in other than its originally intended capacity. For this particular reason, regardless of other interesting points, the receiver which we have just referred to is worth close attention.

Screened-Grid L.F. Stage.

It contains two screened-grid valves among its "battery" of five, the other three respectively acting as detector, power and rectifier valves. But the S.G. valves are not both acting as H.F. amplifiers; one is, and the other is employed as a resistance-capacity-coupled L.F. valve giving an unusually high degree of amplification between the detector and the power output valve.

The circuit thus resolves itself into S.G., det., L.F., and power, with a valve rectifier for power supply from the A.C. mains. So much for the actual circuit of the set. Now for a more general description and details of its capabilities.

As you will see in the illustrations, the receiver is of the table type, with a particularly handsome cabinet, and containing the famous Blue Spot inductor type speaker 100U. A neat metal panel holds the controls, of which there are only five.

These are reaction, wave-change and pick-up switch, volume, tuning, and on-off. The arrangement is simple, making the set very easy to control and operate. A vernier concentric tuning knob on the main tuning control is a great help in getting the last ounce out of the set when listening to distant stations.

Small Aerial Sufficient.

And talking about distant stations, it is as well to point out that the power of the set is such that there is no need for a large aerial; a small outdoor or indoor aerial is all that is needed for comfortable reception of 30 or 40 programmes during the average evening. As a matter of fact, there is no need for an aerial at all if you are not out to get a large number of foreigners, for the receiver is provided with a mains aerial arrangement that allows you to use the electric light wiring as the aerial.

On this there was a slight A.C. hum, but not sufficient to cause the reception of

fairly powerful stations to be spoiled. On the ordinary aerial and earth arrangement the set was commendably silent as regards mains noises.

Selectivity is very good, though it takes a little practice before advantageous use of the volume control, which is a series aerial condenser adjustment, can be made.

Provision for Pick-up.

A gramophone pick-up can be connected to the set with the greatest ease, and the change-over switch controls this in such a manner that there is no need for the pick-up to be removed when listening to radio. It is just left in position ready for use when desired.

The size of the receiver is such that it is very easily installed in any convenient corner of the room, while its appearance will harmonise with any type of furnishing scheme.

Neatness and efficiency have been the aims of the designers throughout the

the Blue Spot W.S.400 is the fact that it has a continuous tuning range of from 200 to 2,000 metres, and it is therefore more than usually suitably entitled to the rather worn phrase, "a set giving real programme value."

Available on H.P. Terms.

It can be bought on hire purchase at very moderate terms. The retail price is 17 guineas, or on extended payments it can be obtained for a very small deposit of £1 15s. 9d., and twelve instalments of quite low value.

The cabinet is of oak, and makes a very handsome piece of furniture. Other Blue Spot models accompanying the W.S.400 are available in various finishes. There is the W.400, which can be obtained in oak or walnut, the Table Grand, which has an energised moving-coil speaker on board, obtainable in two grades of walnut; then there is the Upright Grand, which is the table grand supplied with a pedestal. This is also available in two designs.

Another Model Without Loudspeaker.

The W.400 is very like the W.S.400 in its conception, but it has no loudspeaker incorporated. It has a different shape of cabinet, but as in the matter of all the sets above mentioned, it is the same internally, having the same circuit.

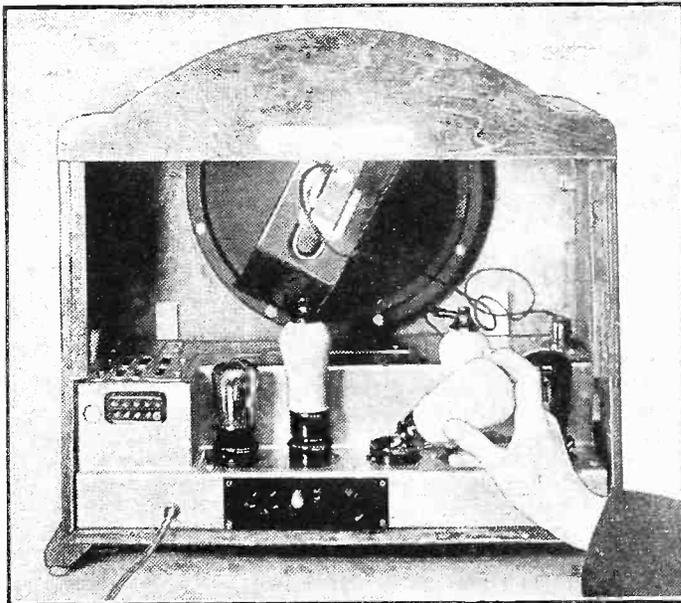
All the Blue Spot receivers are backed by the guarantee and service of the company, and in every set provision is made for the use of extra loudspeakers if required.

There is no doubt that the sets have been very well thought out, and that they should give every satisfaction in the hands of purchasers, no matter in what district (as long as they are on the A.C. mains) in which they reside.

The arrangement

for voltage adjustment is very easy to understand, and nobody should have the least qualm about fixing the W.S.400 on their mains, and setting the receiver for the correct voltage. The system of plug and socket in the metal box at the rear of the set makes the task amazingly easy.

COMPACT AND WELL SCREENED

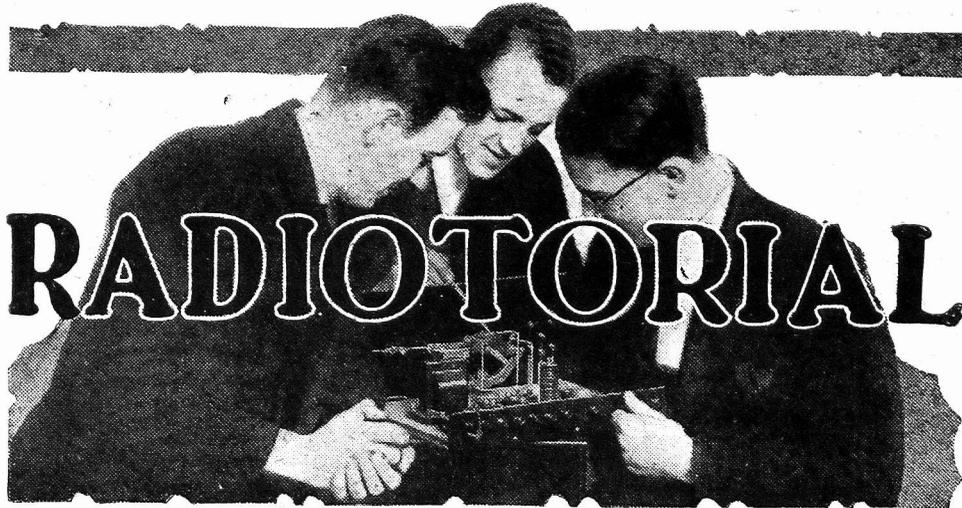


This back view of the set shows how the valves are arranged, and gives a good idea of the completeness of the screening.

construction of the Blue Spot W.S.400, and they have very successfully achieved their object.

Quality of reproduction, too, is of a high order for a completely self-contained receiver, and, as we remarked before, the volume is all that can be desired.

One of the most interesting points about



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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. Lite, 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 specialties described may be the subjects of Letters Patent, and the amateur and the trader would be well advised to obtain permission of the patentees to use the patents before doing so.

QUESTIONS AND ANSWERS

THE L.F. TRANSFORMER.

"SCHOOL," (Northampton).—"How does a low-frequency transformer work?"

To understand the first principles of its action you must appreciate that every electric current flowing through a wire is *always* accompanied by a considerable magnetic field existing around that wire.

When the current starts to flow the field starts to build up. All the time the current is flowing the field exists around the conductor. When the current ceases to flow, the field collapses.

There are some extraordinarily interesting consequences resulting from this. For just as an electric current will not flow along a wire without creating

DO YOU KNOW—

the Answers to the following Questions?

There is no "catch" in them; they are just interesting points that crop up in discussions on radio topics. If you like to try and answer them, you can compare your own solutions with those that appear on a following page of this number of "P.W."

- (1) Where is Britain's new West Regional station being built?
- (2) What foreign station works on a wavelength of 1000 metres?
- (3) What would be the capacity of two one-microfarad condensers connected in parallel?
- (4) To which side of the D.C. mains should the *positive* terminal of an accumulator be connected for charging?
- (5) Does it matter if a fully-charged accumulator is stood aside and not used for 3 or 4 months?

magnetism around it, so also moving magnetic fields cannot be created around a second wire without causing electric current to flow in it.

Thus, if two wires are placed very close together, but not touching, and a current flows in one of them (called the primary), the magnetic field accompanying that current will cut across the neighbouring wire (the secondary), and will tend to produce a second current in it.

Moreover, every change in the primary current

will be reflected by changes in the secondary. Any interruption, any rise or fall in value, will be faithfully indicated.

If the numbers of turns in the windings are equal, say, 500 turns in the primary and 500 turns in the secondary, the effect will be approximately equal, too. But if the secondary has twice as many turns as the primary, the effect will be to produce twice as high a voltage in the secondary as in the primary.

It is quite impossible to give even a brief outline of the many uses to which such a device can be put, or of the manifold rules governing its construction and operation. But probably enough has been said to enable you to form a picture of its functioning.

The primary winding is that coil which is connected at one end to the terminal marked "H.T.+", and at the other end to the terminal marked "P." The secondary winding (which generally has more turns) is joined to the terminals marked G. and G.B.

If it has three and a half times as many turns as the primary, the transformer has a ratio of 1:3½. If it has double that number, the transformer has a ratio of 1:7, etc.

In addition to the two coils which are the basis of the transformer, it has a core of soft iron or alloy which, by helping the magnetic action, plays an important part in the operation.

A good transformer is highly efficient, and almost as much power can be drawn from its secondary as is fed into its primary. In other words, there is but very little loss in the instrument itself.

As electrical power is the product of voltage and current, it will be realised that when the voltage is stepped up—by increasing the number of turns on the secondary in proportion to the primary, so as to get a greater voltage in the secondary—the current which can then be drawn from the secondary will be correspondingly smaller than the current in the primary. Otherwise, more power would be drawn from the secondary than was put into the primary which, of course, is unthinkable.

"P.W." PANEL No. 78. THE COUNTERPOISE EARTH.

It is sometimes recommended that a "counterpoise" be used instead of a direct connection to earth, to minimise interference.

The counterpoise consists of a network of wires—usually 3 or 4—stretched underneath the aerial at a distance of a foot or so above the ground.

It must be carefully insulated, like the aerial, and its bulk is another drawback; moreover, it proves of little or no value in many cases of interference, but in certain circumstances a counterpoise is a great advantage.

'PHONES FOR VALVE SETS.

T. A. M. (Denny, Stirlingshire).—"The following little point concerning telephones is one which I have not seen mentioned, and yet it must be uppermost in many peoples' minds in this district, where the conditions of receiving broadcasting have been entirely altered by the new station at Falkirk.

"It concerns the use of a valve set instead of a crystal, and the question is, can the same 'phones be used? My own pair have always been looked after carefully, and are in first-class condition, leads sound, and results sensitive when compared with other people's 'phones.

"If I get a one-valve set, the 'Cosmic' One, can I use these 'phones on it, or are a different type necessary with a valve?"

There is no reason why the 'phones should not be completely satisfactory on the valve set. You do not say what the resistance of the 'phones is, but most likely they are of several thousand ohms resistance, which will mean that they can be joined direct in the plate circuit of the valve—but make sure they are connected the right way round.

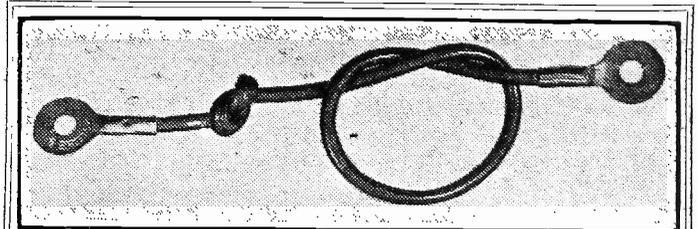
Even if your 'phones are of a special low-resistance type sometimes employed for crystal sets, they will probably give quite good results and satisfactory reception when connected as above, though generally such 'phones are better worked not direct from the telephone terminals of the set, but through a step-down telephone transformer.

AN ALL-WAVE THREE-VALVER.

J. D. (Finchley, N.12).—"I wonder if you could tell me of a good all-wave three-valve set for working 'phones or L.S.? It must be selective as we are only 8 miles from the London transmitters at Brookmans Park, in a slight dip with a good number of houses around, and one or two trees as well.

"I was told this would be no use at all for

WHAT'S WRONG?



Those extremely useful Spaghetti resistances, while being quite robust, may cause trouble if not handled properly.

If you find one too long, don't shorten it by tying tight knots in it, just make a "gentle" loop knot.

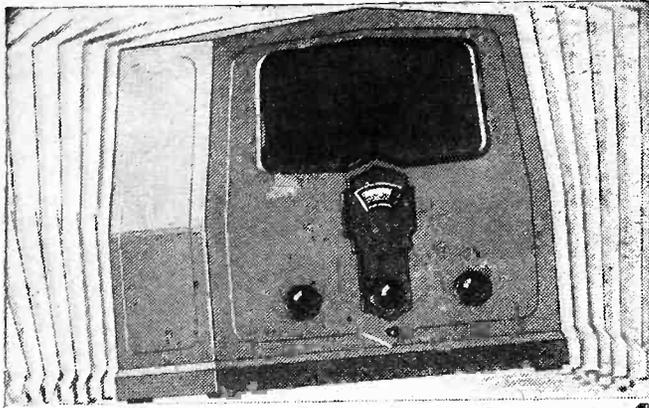
On the other hand, if one happens to be just too short, don't try to lengthen it by stretching, or trouble is bound to result. Fix a piece of wire to one tag by a nut and bolt or by clamping to the baseboard with a screw.

S.W. reception, as it would screen the aerial. If this is so, I suppose it means me giving up the idea of getting on to the short waves?

"Must the aerial be 30 ft. high? This I understand, is the required height for a S.W. aerial; the one in use now is only 25 ft. I should like a set that will work best on the short waves if possible."

For the purpose we recommend one of the "P.W." "Cosmic" receivers—the original "Cosmic" Three (see "P.W." No. 506, February 13th), or the "Cosmic Star" (details and blueprint of which were given in "P.W." No. 507).

(Continued on page 510.)



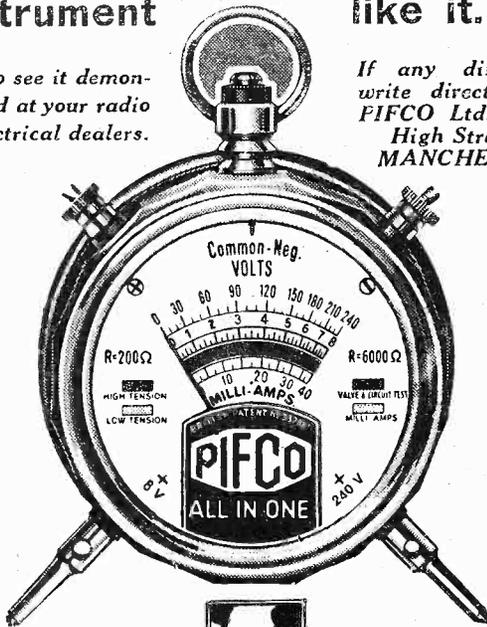
DISTORTION!

TRACK ITS CAUSE WITH THIS WONDER INSTRUMENT

Don't WONDER what's the matter with your radio set. Get an "All-in-One" Radiometer and FIND OUT. Even the novice can trace any radio trouble in a few minutes with the "All-in-One" Radiometer. Tests everything. No other instrument like it.

Ask to see it demonstrated at your radio or electrical dealers.

If any difficulty write direct to:—
PIFCO Ltd.,
High Street,
MANCHESTER.



Standard Model for Battery Sets only. In dark maroon bakelite case.



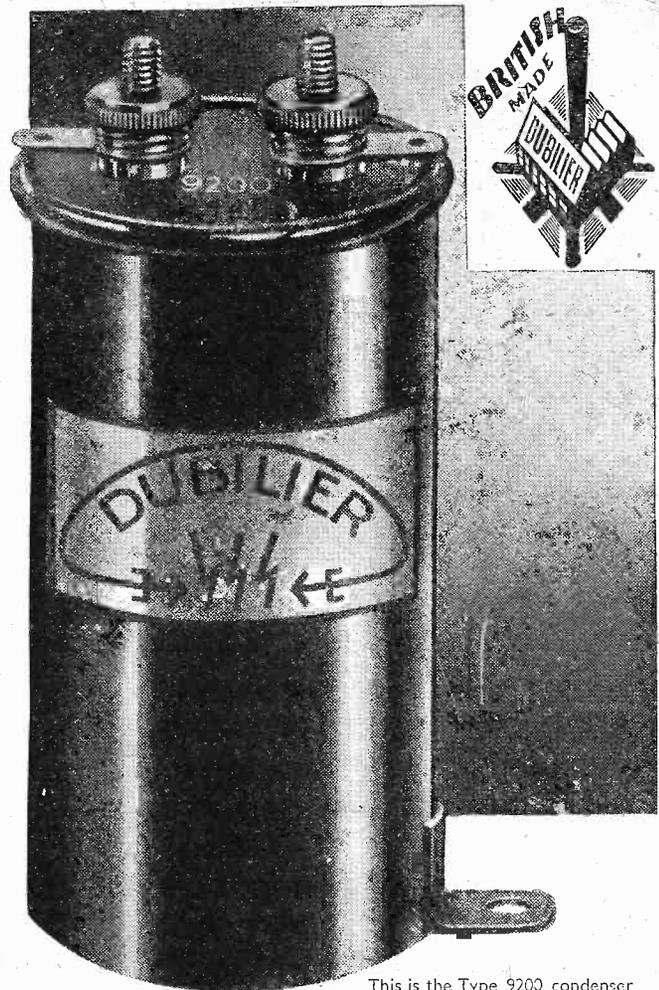
The SHERLOCK HOLMES of RADIO

De Luxe High Resistance Model for Electric Receivers and Mains Units.

12/6

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PIFCO
ALL IN ONE
RADIOMETER



This is the Type 9200 condenser intended primarily for use where lowest radio frequency impedance is required. Ideal for by-pass purposes in H.F. circuits. Working voltage 250 D.C., tested 500 volts D.C. Capacities from .01 mf. to 2mf. Prices from

The 2/- Condensers which never let you down

are made only by

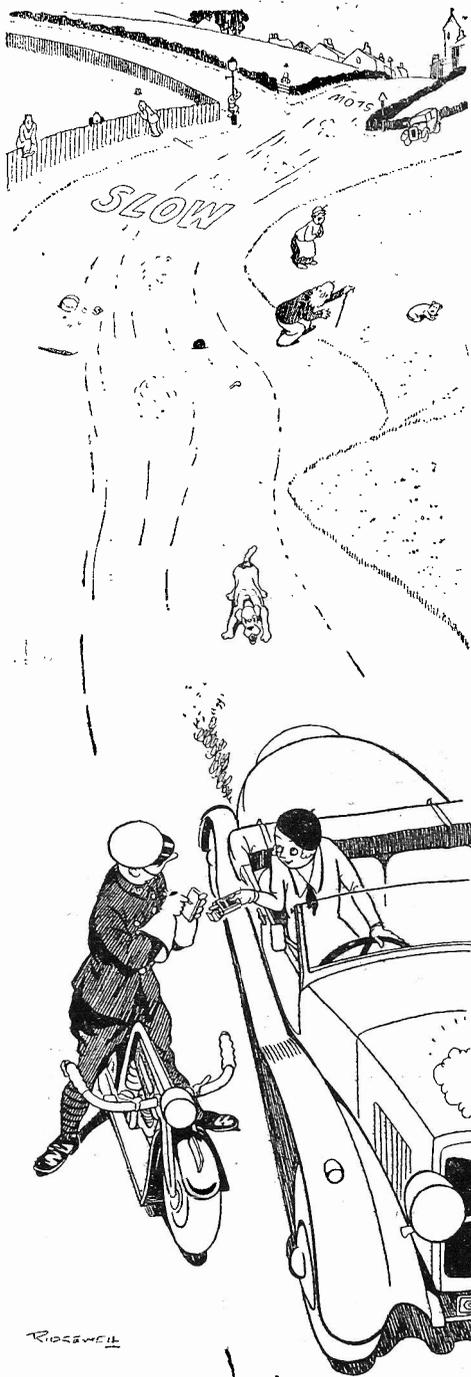
DUBILIER

E.5

DUBILIER CONDENSER CO. (1925) LTD.
Ducon Works, Victoria Road, North Acton, W.3

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 508.)



THE ANSWERS

TO THE QUESTIONS ASKED ON
PAGE 508 ARE GIVEN BELOW:

- (1) At Washford Cross, near Watchet, Somersetshire.
- (2) Leningrad.
- (3) Two microfarads.
- (4) To the positive side of the mains.
- (5) Yes, such treatment is harmful, and likely to lead to sulphation.

(Most accumulators need recharging every month or more often, and disuse is much more harmful than regular discharge and charge.)

DID YOU KNOW THEM ALL?

These sets—and particularly the “Star” model—made short-wave reception extremely easy, while retaining to the full simplicity and ease of handling on medium and long waves. There is no coil-changing necessary, but merely switch alterations to go from one waveband to another.

You certainly should not give up the idea of getting on to the short waves, as it is much simpler than you suppose, especially if a “Cosmic” is chosen with its simple wave-change arrangements.

And you have been misinformed about the aerial: good short-wave results are possible on a “25-footer,” for aerial height and aerial efficiency generally proves far less important on short-wave working than on the ordinary wave-lengths.

The “Cosmic” Three and the “Cosmic Star” give loudspeaker results, but if you desire a simpler set, for phone reception either the “Cosmic” One (“P.W.” No. 521), or “Cosmic” Two (No. 516), will suit your purpose admirably.

THE CARE OF PENTODES.

G. P. (Islington, London, N.).—“It appears to be necessary, when purchasing a new valve, to ascertain in some way or the other that other electrodes are O.K. as well as the filament.”

“I purchased a . . . pentode valve a month ago, and on use it seemed fairly satisfactory, except that it occasionally gave a series of retorts. Suddenly, without any warning, it ceased to function, although the filament remained intact, and I returned it to the makers.

“They told me that the valve had received a severe knock, and displaced the electrodes, and they could only replace on payment of six shillings and threepence.

“This state of affairs seems unsatisfactory, for the valve, whilst in my possession, had most decidedly received no knock, and neither they nor the place where it was purchased feel inclined to accept any responsibility for what was undoubtedly the issue or sale of a defective valve.

“It would interest me, and possibly many of your readers also, for you to give advice as to how one can detect any defect in the grid or anode electrodes of a valve before purchase.

“The filament test is all the shopkeepers seem to trouble about, and the valve in question would have stood the test in that direction, even when returned to the makers.”

Unfortunately, there is no easy test which can be carried out by the purchaser or dealer at the time of purchase.

The old “filament intact” test survives as a relic of the days when valve filaments were so fragile that it was common to find a new valve would not “light up” owing to damage in transit. Such a test is of little use for modern valves.

What is needed is a somewhat complicated verification of filament emission, amplification factor, mutual conductance and so forth, and to ensure these are all O.K. is “some job” for it needs either elaborate test apparatus or a complete receiving set in working order on which all valves could be tried.

As such a testing set would have to show up faults in S.G.’s, detectors, pentodes, L.F.’s, super-power valves, etc., it would be far too expensive and complicated for most dealers to consider, in view of the fact that modern valve manufacture is really remarkably reliable.

Moreover, most purchasers who have been unlucky enough to get a dud valve have found the British valve manufacturers very reasonable as regards replacement, but in cases where the manufacturer rules that he is not responsible for the damage, and the dealer disclaims responsibility also, there is really nothing that the purchaser can do about it.

Pentodes, owing to the small spacing allowed between electrodes, are very liable to damage by mechanical shock, and there is no simple and inexpensive test that will show up such damage.

The only useful test, apart from that of the filament, is to see that electrodes are not touching by means of a “phones and dry cell” or similar test.

OVERLOADING THE DETECTOR.

F. J. J. (Croxley Green).—“The set is a ‘four’—S.G., Det. and 2 L.F.—and in Reading it gave superb quality. But, to my surprise, it now ‘hisses’ on the local stations, though quality on the ‘distant,’ like Radio-Paris, remains as good as ever.

“Is it something to do with the distance from Brookmans Park being reduced? I should suppose so, except for the fact that volume control (on the detector-circuit primary) does not remove the hiss.

“But I notice that dc-tuning the H.F. condenser slightly seems to improve the local reception.

“What would be the cause of that?”

All your symptoms point to the overloading of the detector. The cure is to insert a “pre-detector” volume control.

This may take the form of a very small capacity condenser in the aerial circuit, or of a potentiometer.

Or you might arrange a small indoor aerial for local listening, and switch over to the main aerial only for distance. (There are many advantages in this method, such as freedom from extraneous noises, easy earthing of main aerial, etc.) But to get rid of the trouble, all you need is to reduce the input to the set on local station work, so you should find it an easy matter.

ADDING VOLTS TO AN OLD H.T. BATTERY.

J. J. (Llandudno).—“Being out of work, I have to economise to the bone, and it is a real tragedy when a new H.T. battery is needed, as now. Instead of over 100 volts, it now shows only 76, and I have wondered if, instead of having to lay out on a whole new battery, it would do if I got six or seven dry cells to make up the volts?”

“Could I add these to the old battery (if necessary, backing them up by a couple of new ones in a week or two’s time), or must it be a whole new battery?”

We are afraid the idea of adding cells in this way is not a bit of good.

The trouble is not merely that the old battery is weak—too few volts—but its internal resistance has gone up—too many ohms. This always happens when a dry battery gets old, and the effect is to cause distortion, motor-boating, instability, etc., which cannot be cured unless the old battery is removed.

Backing it up with a new one—even a new one of equal original voltage—is no good, because it does not remove that high internal resistance. The way to do that is to disconnect the old battery altogether and make a present of it to the dustman.

HOW ARE YOUR RESULTS NOW?

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

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

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

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

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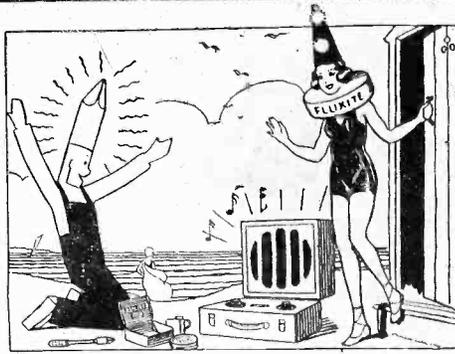
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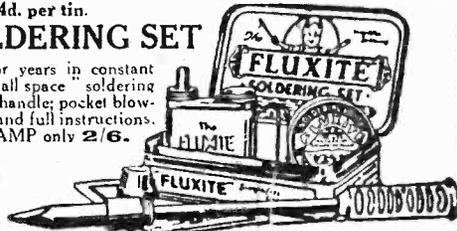
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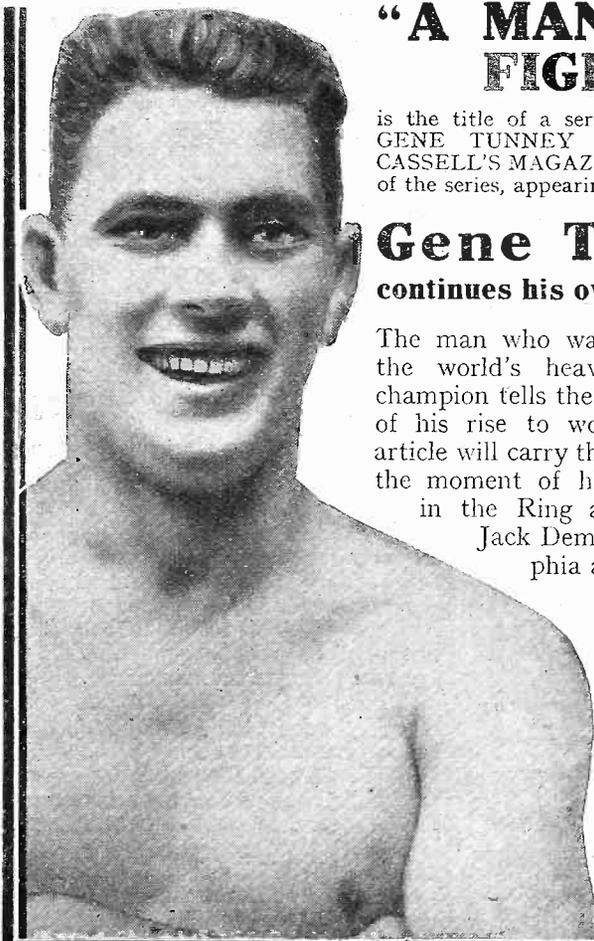
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In "TAMING THE 'RIVER OF DEATH,'" Captain Frank H. Shaw describes a vivid drama of Man's conquest of Nature.

And in "HOLIDAY PLACES AS AN ARTIST SEES THEM," Mr. C. R. W. Nevinson addresses "those who wish to get joy besides fun from a holiday in England."

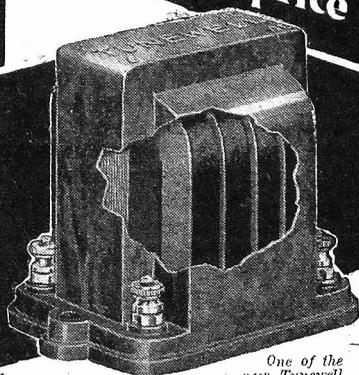
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P.W.3

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FIFTY YEARS OF ELECTRICAL PROGRESS

FIFTY years ago—on September 15th, 1882—the late Dr. Ferranti established the Company of Ferranti, Thomson and Ince—a company which was destined to become one of the greatest names in the electrical industry.

The fifty years' life-story of the firm, which is graphically depicted in a special Jubilee Exhibition staged by Messrs. Ferranti at Bush House, forms almost a history of the development of public electricity supply.

To a firm of such long standing in the electrical industry, radio, comparatively, is a recent innovation. Yet Messrs. Ferranti were in it from the start, and backed by their many years of electrical research and development, they have played an important part in the establishment of our present broadcasting system.

Presiding at a luncheon at the Waldorf Hotel to inaugurate the Jubilee Exhibition, Mr. V. Z. de Ferranti reviewed the progress of the firm; and, on the radio side, referred to their latest development in super-heterodyne receivers—a handsome all-electric seven-valve model which is to be marketed for the remarkably low price of 22 guineas.

This is but one of the many radio wonders to be seen at the Ferranti Exhibition.

RETAIL SERVICE

MESSRS. District Supplies Ltd., started business seven years ago with one small shop and during the past seven years have opened twenty-five more. Their latest achievement is the opening of what is claimed to be the largest, best-equipped and serviced radio emporium in the whole of the British Isles. They have taken the premises at 256, 258 and 260, Bishopsgate, London, E.C., and have made the exterior wonderfully attractive, and the interior of exceptional utility and maximum efficiency.

Messrs. District Supplies are also guaranteeing a free service for receivers purchased from them for a period of one year, and are running a most interesting competition in which radiograms and radio receivers figure in the prize list.

OFFICIAL "P.W." EXHIBITORS

Readers are reminded that further information regarding the components for sets described in this journal can be obtained from official "P.W." exhibitors, who also display P.W. "Cosmics," etc. The latest additions to the list of Exhibitors are given below.

- LONDON.
The Lea Music & Lighting Salon, 632, Lea-Bridge Road, Leyton, E.10.
- RAMSBOTTOM.
Jack Longbottom, Peel Bridge.
- RUSHDEN.
Lektro Radio Stores, 5, Newton Road.

THE LISTENER'S NOTEBOOK

(Continued from page 500.)

which might be called interesting, amusing, or instructive.

Lord Ponsonby said of such a talker that he is an unbearable bore. And I agree. I need say no more about "The Pink, Pink Vase," beyond saying that it was the sort of story likely to be found among a collection of children's bedtime stories, but never intended for adults. The music, however, was quite attractive, and deserved something better than Miss Redman's play.

Why did the Gershom Parkington Quintet depart from their advertised programme of music last Saturday, and give us "Auf Wiedersehen" and "Day by Day"? Was it because, in sending us to sleep, they fell victims to their own dope and needed a rouser, too?

Really, for a Saturday night, their selection was the gloomiest I've heard for some long time. One frequently sees two Volpatti's or two Fontenailles included in one musical group, but never two Sullivan's. I wonder why?

The regularity with which Welsh items appear in our National programmes suggests that there is a demand for them. But who can want to hear Gardening Talks in Welsh, I should like to know. I can think of no one, unless it is the London Welsh. In any case, I would have thought that Carnarvon could have catered for them.

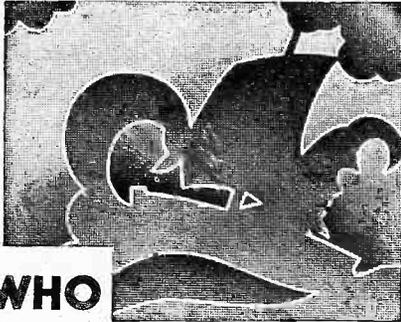
If Carnarvon is anxious to do Daventry a good deed in return, I think I could suggest several items it might take over. What about our nightly Foundations of Music? They might be better appreciated round Carnarvon way; they've certainly had a good run for their money at Daventry. There is also the fact that the other arts might get a look in then.

"Waterloo" made it abundantly clear that Radio drama can receive good compensation for its obvious limitations, from "effects," provided the latter are manipulated in right proportion. This play revealed a more ambitious attempt at realism which, I felt, would have succeeded more had those responsible been bolder in enterprise, and had they realised that "Waterloo" was big enough to take the full measure of "effects."

Why was the dance music at the Ball so sparingly dispensed? It was lovely music, and we could have done with a good deal more of it, and in greater volume, too. Why, at the end of the play, was there such a shortage of surf, and only one cry from one sea-gull? This, in my opinion, might have been a truly marvellous finish.

It all boils down to this. A judicious use of effects can make the Radio play. This is beyond doubt now. Deprived of the use of the eyes, listeners do need the help of something else for a better understanding of a play.

And we haven't far to go for this something else. The Effects Department have shown us what they can do. The quality of their work is unquestionable; it is quantity only which needs attention.



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THE PICTURE PAPER WITH THE
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TECHNICAL NOTES

Some diverse and informative jottings about interesting aspects of radio reception.

By Dr. J. H. T. ROBERTS, F. Inst. P.

Helping a Mains Unit.

I HAVE several times been asked whether it is possible to use a mains unit and an H.T. dry battery at the same time. Many readers have mains units which, whilst they operate perfectly well under their normal load, are insufficient for the requirements of some particular set; it seems a pity to go to the expense of buying a larger unit, and the obvious thing to do is to use a battery to supplement it.

In many cases this is quite a simple matter, and, in fact, I had a case only a few days ago in which a three-valve set was working perfectly with a mains unit for the power valve, and a dry battery for the first two. You will notice that it is better to arrange matters in this way, because the output valve is usually the principal consumer of current, and is also the one which is the least ticklish with regard to hum or interference.

This, then, is the obvious place to use the mains unit. The valves preceding the output stage are, as a rule, much more dainty in their current requirements, both as regards quality and quantity, so that here a dry battery meets the case very well.

The Ticklish Detector.

If there is any lack of smoothing in the current supply to the detector and H.F. stages, hum will become much more marked than would be the case with a poor supply for the output stage. In view of the relatively small current consumption of the earlier stages of the set, the load upon the dry battery should not be anything very serious.

An arrangement of this kind is often used with perfect success. In fact, I have met amateurs who prefer it, owing to the extra freedom from hum and any sort of interference, even if the maintenance of the H.T. battery is a little more troublesome than using a mains set for the whole outfit.

Pre-H.F. Volume Control.

Sometimes you may get overloading of the H.F. valve, necessitating some kind of pre-high-frequency volume control. It is true that the desired effect can be got by detuning, but this is very liable to run you into distortion and other difficulties, especially in a very selective set.

A much used arrangement for controlling volume prior to the first H.F. stage is to connect a high-resistance potentiometer across the tuning coil preceding the H.F. valve. The grid should, of course, be disconnected from the end of the aerial coil and connected to the slider of the potentiometer.

As the slider is moved, the amplitude of the signal voltages can be varied, so controlling the input to the set. Your first thought is probably that the resistance connected across the secondary coil may

(Continued on next page.)

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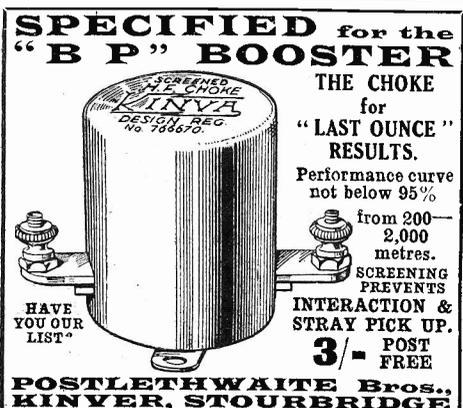
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TECHNICAL NOTES

(Continued from previous page.)

have a damping effect on the tuning of that coil, so as to flatten the tuning, but this really depends upon the actual value of the resistance.

Of course, if the resistance is too low the tuning will certainly be flattened. It is, therefore, important to keep the resistance sufficiently high, a suitable value being, say, between 100,000 and 150,000 ohms.

Indirectly-Heated Valves.

In a mains set the usual arrangement with regard to the cathode of the detector valve is to connect this direct to the grid-leak and to H.T. minus. But if you introduce a little potential-difference between these two points you will often find that not only the detection but also the reaction will be improved.

The idea is to make the cathode a little less negative than the grid. This can very simply be done by introducing a small resistance of about 200 to 300 ohms between the cathode and H.T. minus. In this way you will see that instead of the cathode and the lower end of the grid leak being at the same potential, there is a difference of potential between them. This difference depends upon the value of the above-mentioned resistance and also on the current which is flowing. The inclusion of the resistance also reduces the actual grid current which flows.

Improving Detection and Reaction.

There is a good deal of difference between various mains valves as regards the grid current which flows and the particular point at which it commences to flow, so that there is plenty of room for you to try out different values of this resistance so as to get the best results. The actual potential of the grid will naturally depend upon the value of the grid leak, so that the difference of potential between the cathode and the grid will depend not only upon grid current, but also upon the values of both the above-mentioned resistance and the resistance of the grid leak itself.

By taking a little trouble in getting exactly the right value for these resistances for any particular set of conditions, you can often effect a considerable improvement in results. This applies to the detection and also in the smoothness and general control and efficiency of reaction.

Valve Damping and Oscillation.

I had a case the other day where a portable set was producing an annoying high-pitched whistle which was very difficult to get rid of, and this I found was due to the H.T. dry battery having become rather dried up, so that coupling effects were set up between different parts of the circuit. This, of course, is a very well-known cause of this trouble, and even with decoupling arrangements there comes a time when there is nothing for it but to substitute a new battery.

You can put off the evil day to some extent by trying a valve of different impedance, especially in the detector position. You may find that with one of suitable A.C. resistance the same battery will serve you for an appreciably longer period, so that if you happen to have any spare valves on hand, this is always a point worth trying before discarding the battery.

When another valve does the trick, even temporarily, it is due to the extra damping caused by the valve. But if you want the best results and you have pretty good reason to know that the battery is getting on its last legs, it is really the best plan to fit a new one as, when all is said and done, these other dodges are only in the nature of makeshifts.

When the Fuse Blows.

Perhaps you may remember that some time back I mentioned a very persistent trouble which I had with a mains set, due to the fuse continually blowing when the set was switched on or off, particularly when it was switched on. Several readers have written telling me they have had exactly the same kind of trouble.

It is quite a well-known effect and is probably due to the charging-up of the condensers in the set. One letter, from a reader in Dumfries, sets the position out so clearly that I think I cannot do better than quote from it.

I should, however, mention that the writer of this letter is in business as a wireless and electrical engineer. He therefore has had very good opportunities of noting this effect in the various sets with which he has dealt.

Blame the Condensers.

He says: "With reference to the trouble you mention with fuses, which for no apparent reason 'blow' on switching on

NEXT WEEK

The "P.W." A.C. RADIOGRAM

Details of a magnificent All-Mains Pedestal-Type Instrument.

or off, I have often noted the same effect, even on new D.C. mains sets, and for some time I was like you, afraid of accidents. Careful consideration of the design of the various components and the methods of manufacture has led me to the belief that certain of the condensers are responsible.

As you know, a common method of manufacture is one in which paper strips are coated with metal and then run between metal rollers with a considerable electrical potential between them. This process burns out any shorts which occur through the paper insulation, and the metal-coated paper is then ready for folding or winding.

My opinion is that in condensers of this type shorts do occasionally occur, and if the short does not happen to be very rapidly burnt out, then the fuse blows. Some sets show these symptoms in their earlier days, and later when the condensers have aged a bit the trouble disappears and reliable service may be expected with the normal capacity fuse."

A Safety Hint.

Apart from the observations of my correspondent as given above, there is the

(Continued on next page.)

TECHNICAL NOTES

(Continued from previous page.)

question of the charging-up of the condensers. If the set has been switched off for some time and is then switched on, there may be a sudden rush of current, in the charging of the condensers, sufficient to blow the fuse.

A dodge which is sometimes useful is to connect a fairly large capacity condenser across the terminals of the fuse. In some cases this will take the sudden load off the fuse, but it doesn't always work.

Valve Characteristics.

Have you ever noticed that in using screen-grid metallised valves you will occasionally get the main or control grid shorting to the filament? When this is about to happen it is heralded by a series of microphonics and other symptoms of a similar kind. Finally the valve goes dead and the shorting mentioned above is discovered to be the cause.

When this takes place it would seem to indicate that the construction of the electrode system is not really sufficiently rigid, having regard to the close proximity of these electrodes to one another. Another point which arises in this connection is whether the characteristic curve of such a valve is worth taking much notice of; this obviously depends upon the electrode arrangements, and if the latter varies the curve will vary, too.

When the short circuit takes place it can often be put right by gently tapping the valve. It will then continue to function in a normal way, at any rate, to all appearances.

Connecting a Pick-up.

When connecting a pick-up to a radio set you have a choice of a number of ways of putting it in circuit. Not only the efficiency, but also the cost of the conversion depends upon the particular arrangement you decide to adopt.

One comparatively simple way is to connect the two pick-up wires to the ends of the grid leak of the detector. If this arrangement is used, however, there are certain important points which want watching.

For one thing, remember that there is a current passing in the grid circuit. This will be affected by the voltages delivered by the pick-up, so that the effective load alters from moment to moment, and the variation is liable to produce distortion.

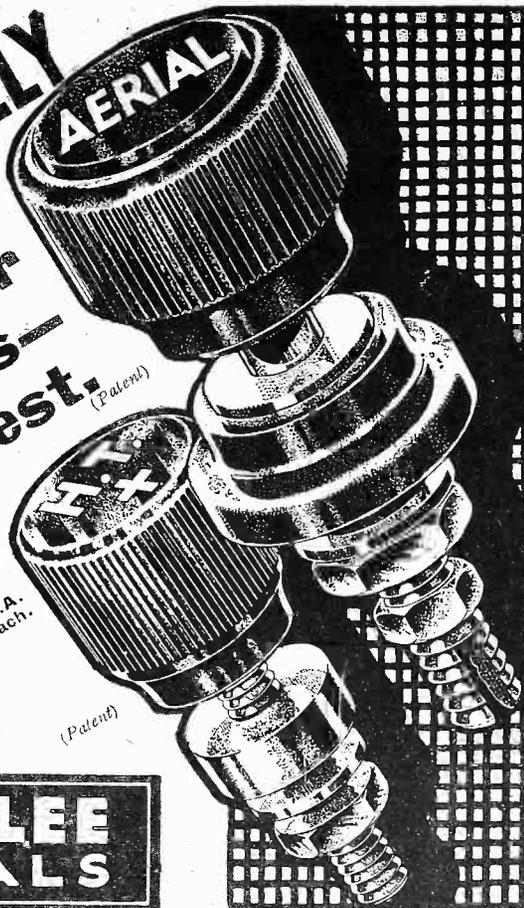
Detector Valve as Amplifier.

If the valve is used as an amplifier, by the application of the appropriate bias, the pick-up can be arranged so that it can be switched in or out of circuit by means of a single-pole two-way switch. The ordinary connection to the grid is broken and the grid is connected to the centre of the switch, the lead which previously went to the grid being now joined to the second pole of the switch, and a terminal of the pick-up to the third pole.

The other wire from the pick-up goes to a tapping on the grid-bias battery, connected in series, of course, with the secondary of the first L.F. transformer. In order to work the valve as an amplifier, usually a

(Continued on next page.)

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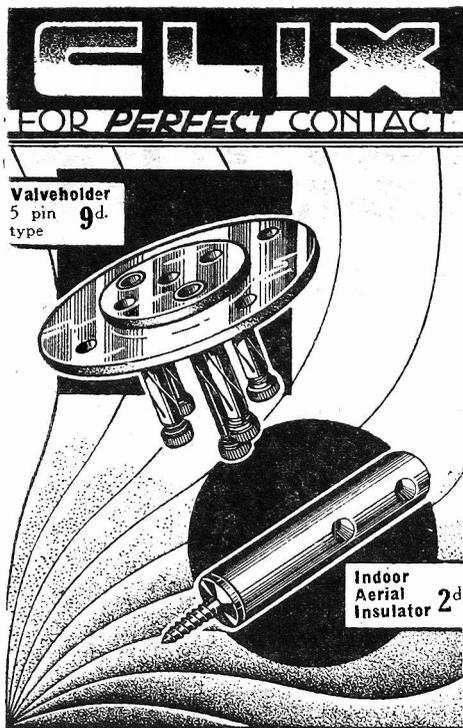
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TECHNICAL NOTES

(Continued from previous page.)

bias voltage of $1\frac{1}{2}$ volts is sufficient with the proper amount of high tension.

Often you will find that the high tension which was applied to the valve when used as a detector is not sufficient when the valve is being used as an amplifier. So you must be careful to increase the H.T. voltage to the right amount.

Short Grid Leads.

You will see from the foregoing that when the two-way switch is in one position the pick-up is out of circuit and the arrangement is working as an ordinary receiving circuit, whilst when the switch is in the other position the pick-up is in circuit with the low-frequency part of the set, the detector valve now acting as first amplifier. I need hardly say that the grid connections should be as short as possible, and also the pick-up leads, and there should be no bad contacts or other defects in the switch used.

Quiet Mains Operation.

With an all-mains set, or an ordinary set operated by means of a mains unit, the earthing is very important if you are to avoid mains hum. I have often been asked to look at mains sets which were humming badly, and I have found that there was nothing more seriously wrong with them than an inefficient earth—or in one or two cases no earth at all.

I frequently use a particular mains set which is in such a position that the earth lead has to be rather long and runs away to a water-pipe. It is not convenient to make a permanent connection, and so the earth wire ends in a crocodile clip which grips the handle of a water-tap.

Sometimes, as you can imagine, this clip gets knocked off the tap, but when you switch on the receiver you don't have to go and look if the earth connection is all right, as you can tell that immediately by the A.C. hum. If the earth connection is replaced all is well again.

A good earth connection is the first line of defence, as it were, in getting over hum and other types of interference, and if you have any trouble in this direction it is well worth while to make sure that you have a good connection to earth, and that the "earth" which you use is itself really at ground potential.

Replacing the Detector.

Sometimes if anything goes wrong with the detector valve and you replace it by another, you may happen to come upon a valve which is more efficient in that position, with the result that the reaction becomes "fierce." This, of course, is owing to the fact that the second valve which you put in is more sensitive or gives better magnification than the first.

This fierceness of the reaction can be got over by reducing the amount of H.T. which is applied to the detector, but although at first sight this seems a very simple way, it is not really the best way, as it is very liable to lead to distortion.

Improving Reaction Control.

A better way is to leave the H.T. alone—it may require a small amount of adjustment but nothing more serious—and to connect a fixed condenser, say .0001 mfd.,

across from the anode to filament. This will have the effect of assisting in the rectifying action of the detector and may also increase the strength of the signals.

The control of the reaction, instead of being made worse will, as a rule, be improved and in that way you will be able to take advantage of the extra efficiency of the new valve instead of this extra efficiency being a disadvantage.

Valve Slopes.

Power valves in these days have been made so sensitive and with such steep slopes that they have to be handled with a certain amount of respect and circumspection. Some people just put in a power valve and then twiddle about with the grid bias until they get reasonably good results.

This, however, is not fair to the power valve and not fair either to the high-tension battery. The anode current varies enormously with the grid bias and you may get good results with one G.B. voltage, for instance, 7½-volts negative, and then try a lower voltage, say 6-volts negative, and find that the results seem just as good or practically so.

But unless you have a milliammeter to measure the current which is being passed out of the H.T. battery you will never know what effect this change in the grid-bias voltage has had upon the H.T. current. It may well be that the small drop in grid-bias volts may cause a large increase in the H.T. current.

Watch the Bias.

On the other hand, if you increase the grid-bias voltage to, say, 9-volts negative, this will reduce the anode current below the original value, which is all to the good provided you do not get distortion. So what you want to do is to get the largest amount of grid bias, that is, the smallest value of H.T. current, which is consistent with good reproduction.

As I have said before in these Notes, a milliammeter is a most useful instrument, and this is one of the cases where it comes in particularly handy. It is all very well to think you can judge the effect by ear, but it is quite unsatisfactory from the point of view of current consumption.

Push-Pull Precautions.

I was saying something the other day in these Notes about the use of valves in push-pull arrangement, and I am reminded by a reader that not only must due care be taken with the valves, but also with push-pull transformers.

Take the input transformer, for example, with a single primary winding and a double secondary, or rather a secondary having a centre tapping. Now when the primary winding is excited we ought to get exactly identical effects in the two halves of the secondary. The centre tapping ought to give us the true electrical centre and we base our arrangements upon this assumption.

But in a good many transformers this is not the case. In fact, in some that I have examined it is very far from being so. The tapping is not the electrical centre, and consequently the two halves of the secondary give appreciably different voltages when the transformer is in operation. This means that the two valves used with the transformer do not give equal outputs and distortion is produced. The same applies, of course, to the output transformer.

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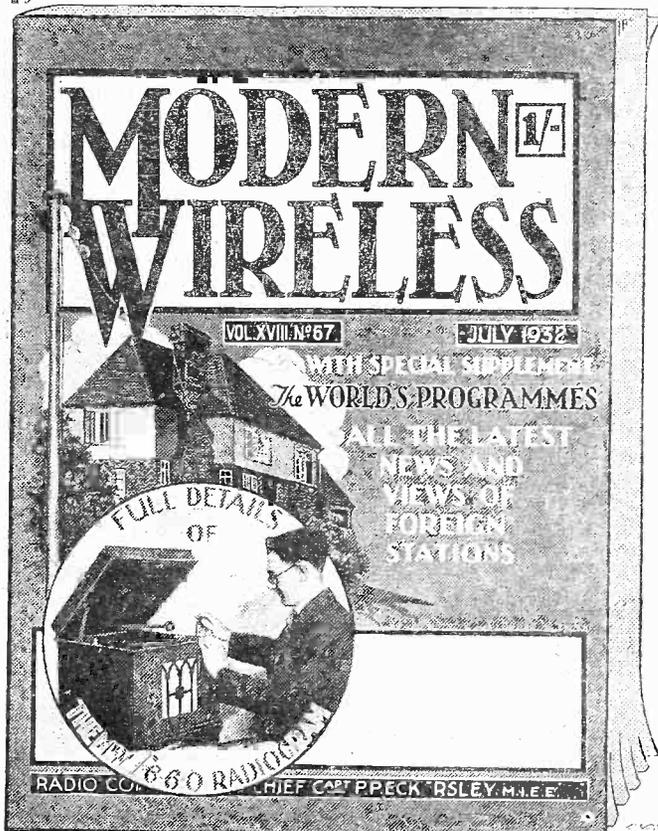
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