

Amateur Wireless

N° 339
December 6, 1928

GLAD TO SEE YOU ALL



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"ALL-BRITAIN 3"

A Reyner Set Tested and Giving Proved Results throughout Gt. Britain.

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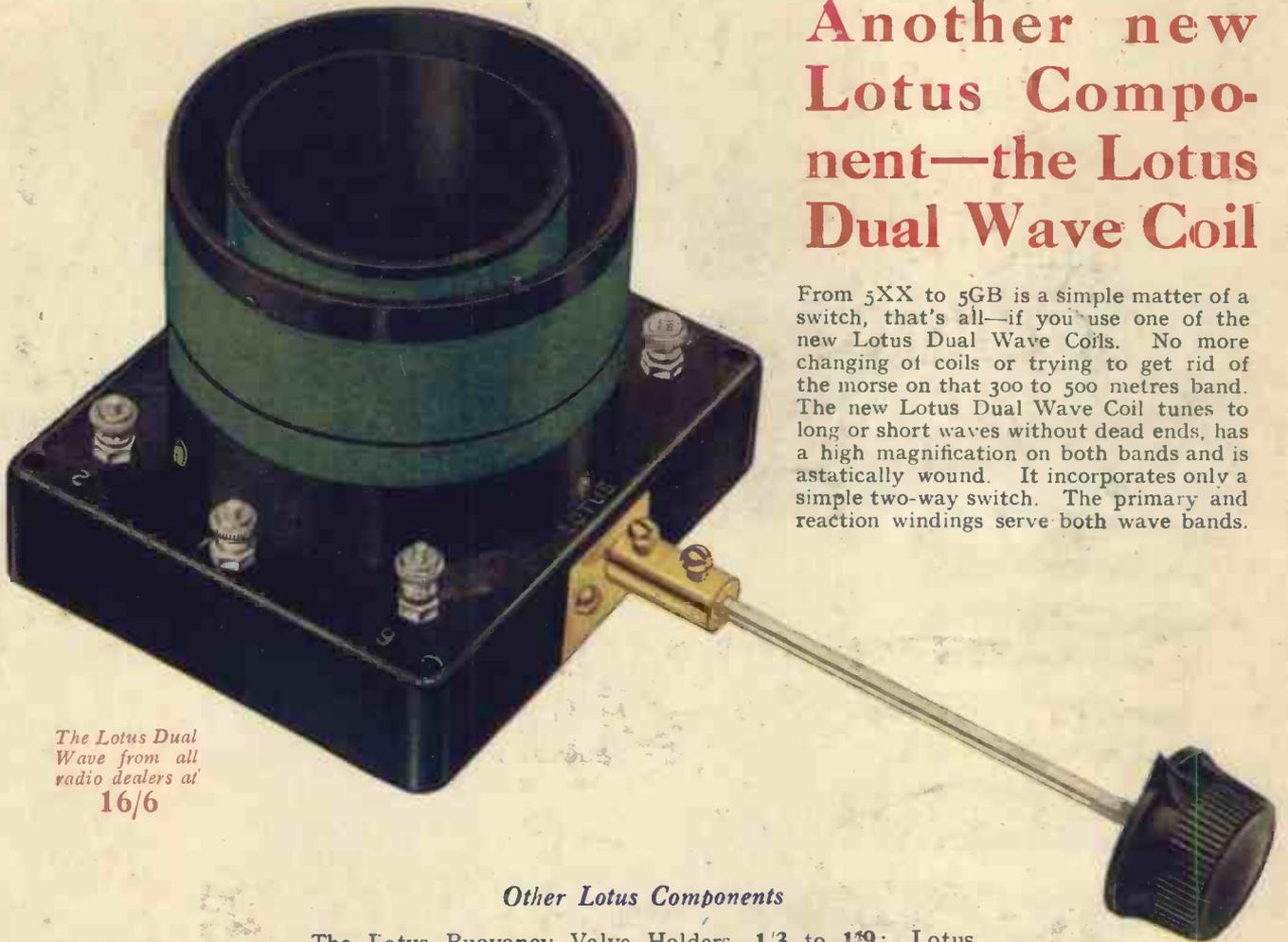
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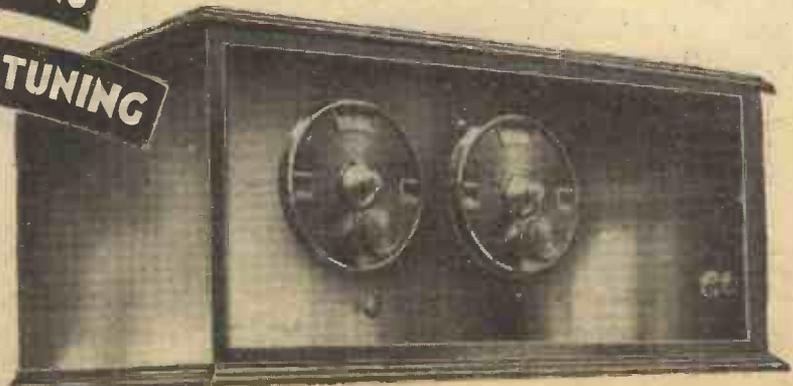
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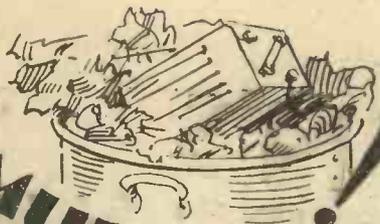
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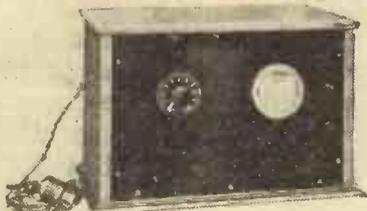
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A.W. 8/12/28

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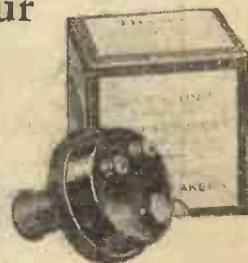


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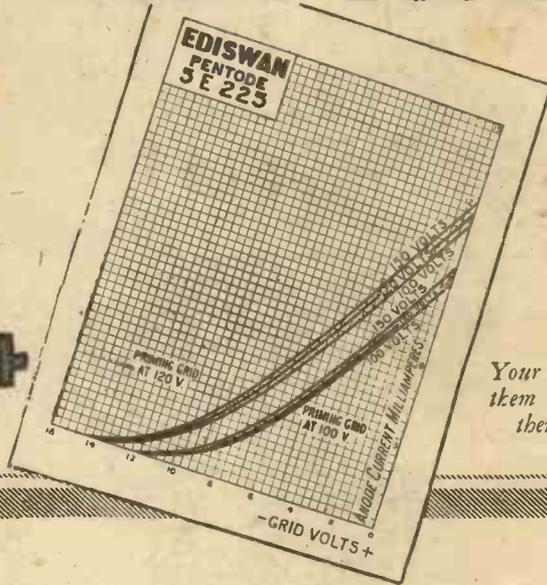
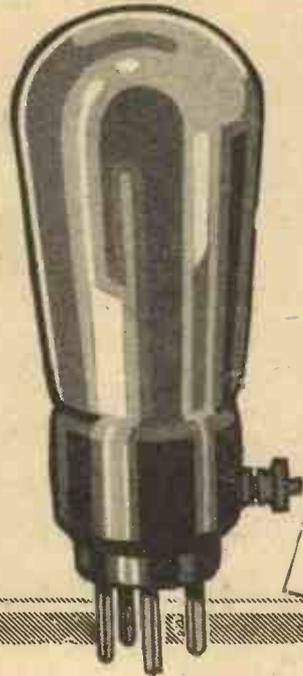
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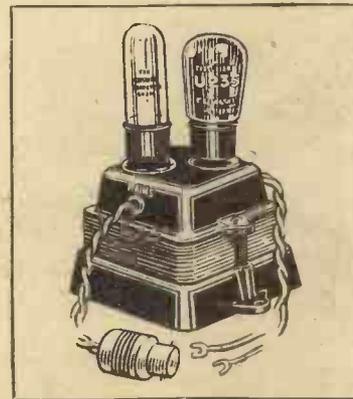
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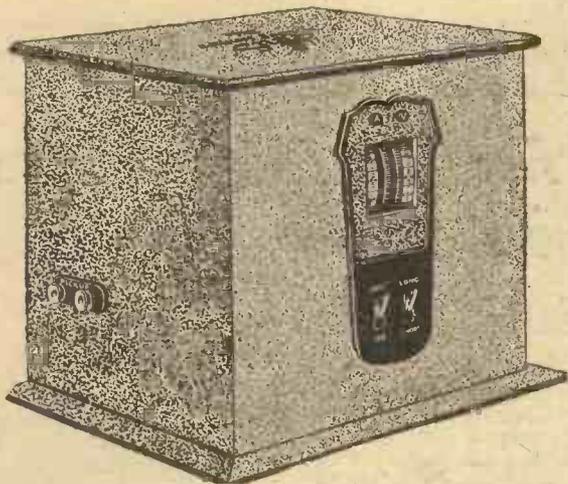
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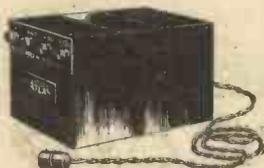
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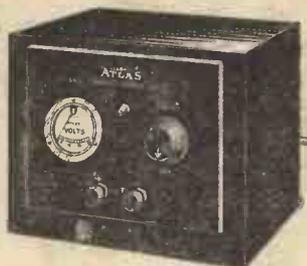
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For 2-, 4-, 6-Volt Valves up to 1 Amp. *Price £10 10s. 0d.

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GREAT MYSTERY RECEIVER

No longer a mystery, Six-Sixty's great new Receiver has proved itself the very finest of the popular home-built sets. Dozens of European programmes searched out and brought in every night—no interference between them—the tone noticeably pure—the volume ample for any room. The Six-Sixty valves are carefully matched to promote supreme efficiency; and remember, the extra valve makes all the difference.

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To SIX-SIXTY RADIO COMPANY, 122 Charing Cross Road, London, W.C.2
I am interested in this set. Send me all constructional details, please.
NAME
ADDRESS

A.W.1

Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

Editor: BERNARD E. JONES

Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E. :: Research Consultant: W. JAMES :: Assistant Editor: H. CORBISHLEY

Broadcasting House—The Big Breezes—The B.B.C. Receivers—"Number Three"—Fultograph Change—No "Mess"—The £90,000 Announcer

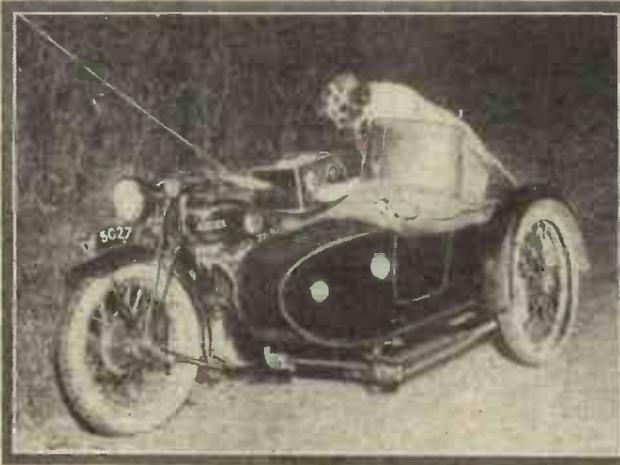
Broadcasting House—So the B.B.C. is at long last to have a London headquarters in keeping with other London buildings of big organisations. Britain boasts a broadcasting scheme comparable with any other in the world—and Savoy Hill is something of a reproach to an efficient business body. But Broadcasting House will open up a new era.

£500,000!—As a humorous B.B.C. official remarked to an "A.W." correspondent, listeners need not expect the licence fees to go up as a result of the cost (£500,000) of building Broadcasting House! The B.B.C.'s opinion is that listeners will, in 1931, reap the benefit of a more efficient broadcasting headquarters. So we must wait and see!

The Big Breezes—The recent storms played havoc with land-lines, and many broadcasting stations found themselves cut off from their programme source. Stations north of Leeds were particularly affected, while Belfast was also in difficulties. Bournemouth's aerial came down. Radio links took the place of land-lines when catastrophies occurred!

The B.B.C. Receivers—As a matter of fact Daventry rebroadcast receivers are standardised at all transmitters, and are used sometimes for ordinary S.B. work and nearly always when a land-line breaks. Except at Cardiff, the receiver is located a few miles away from the transmitter, but is remote-controlled so that there is no need for an engineer to stop at the listening post. Six valves are used: neutralised, resistance and tuned-choke H.F., bottom-bend detector, followed by two R.C.C. stages. The circuit is permanently tuned to Daventry 5XX, and is quite stable in operation.

"Number Three"—Savoy Hill's new futuristic studio now has



This photograph shows how short-wave work can add interest to motoring on winter nights! America is being received at 11.45 p.m. on the Chiltern Hills

its "jazzy" carpet, but the distinct echo, mentioned last week by an "A.W." correspondent, has not yet been cured. A peep into "No. 3" revealed B.B.C. engineers at work tracking the echo period—so soon the new studio will be in operation. It will

be another three years or so before Broadcasting House materialises and in the meantime, Savoy Hill is badly in need of this newcomer—"No. 3."

Fultograph Change—Very shortly a rather important change will be made in the transmission of Fultograph pictures. At present, a copy has to be made of the picture to be transmitted, and this is done so that intermittent contact can be made between the transmitting "pen" and the rotating cylinder. In the new system the original picture will be used, and a photoelectric cell will pick up the light variations. This should result in a better definition of the received pictures.

No "Mess"—A second Fultograph development is promised. Paper will shortly be available to owners of Fultograph equipment which will obviate the somewhat messy business of "doping" the paper before it is clamped to the cylinder. The new paper will be sensitised and will need merely to be dipped in distilled water before use. A distinct improvement which should make picture-receiving simpler than ever.

The £90,000 Announcer—The romance of the "mike," for spinners, is increased now that the Hon. David Tennant, a regular B.B.C. announcer, has inherited a fortune and a mansion. He is not giving up his radio job, so any voice may be that of the £90,000 man! But—he is married,—to Miss Hermione Baddeley, the actress, who incidentally, is not giving up her stage work.

5SW—The Continental Limited Canadian National Railways train, moving eastward from Vancouver to Montreal, recently picked up 5SW (Chelmsford) while it was passing Favel, Ontario. The reception lasted fifteen minutes.

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IF I RAN THE PROGRAMMES!



The Critical, Practical, Lively and Severe Suggestions of a Number of Well-known People

Collected By **PEARKES WITHERS**

At the Editor's request I have asked a number of famous people what they would do if they ran the B.B.C. programmes. They have responded gallantly, if in some cases evasively. But whether their replies are helpful or otherwise must be left to the judgment of AMATEUR WIRELESS readers—and to the officials of the B.B.C.

H. DE VERE STACPOOLE

(The Famous Author of "The Blue Lagoon" and many other delightful novels).

I would like more after-dinner speeches. There is a lot of good stuff being spoken nearly every night in London and wasted on a few over-stuffed and half-fuddled listeners.



Also, I would like less cabaret—or whatever it is that sounds like a public-house burst open when the set is switched on.

Less modern music—more classical. And more children's concerts, if it were possible; they are simply delightful.

J. E. BUCKROSE

(Authoress of "Down Our Street" and more than thirty other charming books).

If I had ever attempted to run the B.B.C. programmes, I should now be qualifying for the lunatic asylum, attired in loose leaves of AMATEUR WIRELESS, and with spare valves in my hair.



But as I only pursue the easy and, apparently, congenial task of criticism, I suppose I feel and think much the same as the average listener. That is, I really do find in wireless an entirely extra and added interest and joy in my daily life.

But I also say to myself—every day and in every way—that if I ran the programmes I should eliminate the high soprano voice from all transmissions.

This is a cruel thing to be said by one who loves her fellow woman, and who enjoys true soprano singing in the concert-hall and in private life. But it is a view that I have heard expressed many times. I only advance this suggestion for what it is worth; and that—in the judgment of those who matter in musical affairs—is exactly nothing at all.

I should like to have said something else, of course; but the plain fact is that, but for this, I am satisfied and have no other criticism to make.

JOHN HENRY

(The Popular Wireless Comedian).

A comedian—even a wireless comedian—should not, I suppose, be taken too seriously, but theatrical stars who are really splendid on the ether could probably be counted on one's fingers and one's toes; and for this reason if I ran the B.B.C. programmes (honestly speaking, I shouldn't much care for the job!) I should certainly book and star the various artistes, not according to their stage reputation, but according to their wireless ability.



Wireless technique is as different from stage technique as from film technique, added to which the ether (or something) seems to improve some voices and to ruin others. Some of our greatest vocalists of the concert platform and the stage lose all their quality between the microphone and the loud-speaker, whereas a number of vocalists who do not scintillate in public broadcast wonderfully.

Some of the "outside" stars, whether vocalists or variety artistes, are very expensive, and if I were running the B.B.C. programmes I should save a lot of money by leaving them to shine in their proper orbits, instead of coaxing them to the "mike." In their stead I should engage performers who were really suited to the medium and endeavour to train budding talent in those who promised well.

Perhaps, however, I should add that Blossom declares I am all wrong in this—that the public are impressed by big names, even when their owners prove disappointing. And she assures me that if I were to run the B.B.C. programmes the makers of wireless sets would be ruined and few listeners would

renew their licences. Maybe she's right, but Joe Murgatroyd sides with me.

C. J. CUTCLIFFE HYNE

(The Famous Creator of "Captain Kettle.")

Wireless pervades one room of my house, and I mostly get out when it is turned on, by reason of its being so exquisitely dull. I always seem to hit upon somebody who is talking in a flannel voice, a bad band, some bore maundering on the manufacture of music, with intervals of tiddley winks on the piano, or an official holding forth on the anti-somethings which influence the weather, or giving specifications of uninteresting printed matter which he seems to want to peddle.

The B.B.C. has, one gathers, an enormous income. I would like to see a balance-sheet setting out the details of its income on one side and on the other how much it has spent on programmes, and how much on political and other passengers who do not pull their weight.

MAY EDGINTON

(The Popular Woman Novelist).

If I ran the B.B.C. programmes I should be very puzzled indeed as to how to please everybody. However, I feel sure I should try to fill my programmes with topical and popular items only—and nothing dull or academically informative. I should never, under any circumstances, invite any artiste or author to talk about himself, or herself, or to read selections from his or her works.

I should plump for music, especially vocal and orchestral; for church services; for political and ministerial speeches; and for humorous stories



SANTOS CASANI, COMPTON MACKENZIE, A. J. ALAN, ANDRE CHARLOT, MARK LESTER and VIVIAN FOSTER on the Programmes

SANTOS CASANI

(The Famous Teacher of Dancing).

It always has been, and I fear it always will be, impossible to please everybody. It is difficult enough to please the majority. Therefore, I should not care to run the B.B.C. programmes, and I sympathise greatly with the B.B.C. in its unenviable task. But if I had to run the programmes I think I should do several things differently.

For one thing, I should cut out all talks of an educational or dreary description in the evening, because the evening is not the right time for them. People who have been at work all day desire entertainment in their leisure hours. The tired business man naturally says, "Oh, cut that off!" when somebody begins to tell him—through the loud-speaker—about the habits of the gadfly. And I am not at all sure that I should broadcast plays. Most plays are tedious when unseen, and for those to whom the play doesn't appeal most of an unrecapturable evening is wasted.

I should go in for variety. A talk here, and perhaps on rare occasions—a play there, but variety always. Every kind of thing is right at the right time, so long as it is not overdone. The complaint I see most frequently in the papers concerning B.B.C. programmes is that things are overdone, that there are too many talks, that there is too much highbrow stuff, too much lowbrow stuff, too much jazz, too much Mozart, and so on. The advantage of a variety show is that there is something in it to please everyone.

I should encourage the rivalries of counties, foster local patriotism, and give John o' Groa's a chance of listening to Land's End.

But, as I hope I have made quite clear, I am entirely a friendly critic of the B.B.C. It is so easy to find fault!

COMPTON MACKENZIE

(The Distinguished Novelist).

If I ran the B.B.C. programmes I should thank God if I could run them a quarter as well as they are run at present.

A. J. ALAN

(Whose Broadcast Stories are so popular with listeners).

I heartily approve of the way in which the B.B.C. programmes are run and have no suggestions for alterations to offer.

ANDRE CHARLOT

(The Famous Theatrical Manager).

Although I have a lot of ideas about what I would do, and what I wouldn't do, if I ran the B.B.C. programmes, I am afraid the fact that I contributed thirty-two hours of the B.B.C. entertainments during this year makes it impossible for me to express my views on the matter.

MARK LESTER

(The Inimitable Comedian, now playing in "Blue Eyes" at Daly's Theatre).

Oh, what a lovely idea! Wouldn't I have a happy time—and wouldn't the listeners! I'd cut out all the talks, except those I wanted to hear myself; I'd insist on every famous musician having his hair cut before he came to the studio; I'd provide a real bar at Savoy Hill, where, all the staff and all the performers could have a few whenever they felt really thirsty (thus reducing the water-rate on the premises); and I'd pay myself £10,000 a year—at least!

Of course, the listeners wouldn't be any better off than before—but I should be; and, after all, what is a paltry ten shillings a year to a listener? There couldn't be any more complaints than usual; and, anyway, I shouldn't read the correspondence. The sort of people who are always full of complaints would have to take their medicine, and that's all about it.

I should go in for novelties, of course. The tired business man ought to be catered for, and I should cater for him. The sound of champagne corks popping all over the microphone would wake him up, and that would be my tuning-note in the evening. Occasionally I should get Mr. Bass and Mr. Worthington to provide a (not very) cross talk, and I should certainly broadcast the joy of a bookmaker paying out on a 20 to 1 chance. The noise of a gale in the Channel, on a really stormy night, would reconcile a lot of people to their own firesides, not to mention my programmes.

Music? Oh, lots and lots of music. Music is what the public want most of all. But only tuneful stuff. Like "In a Monastery Garden" and—well, like "In a Monastery Garden"—you can't have too much of a good thing. Never anything highbrow. The people who want highbrow stuff could go to—well, wherever the people who want highbrow stuff could find it. Personally, I prefer to lose it.

Bells? Oh, yes, of course—from Canterbury bells to the belles of musical comedy. But no saxophone stuff—except when there were plenty of atmospherics about to go with it. And I should sack every announcer who said things like "A depression off the south of Iceland . . ." or "In the issue of the

Radio Times published to-morrow . . ."

I should go farther—a lot farther. I might go further now—but what's the use? It's a dream—an idle dream—one of those things that go-by contraries. I can feel it in my bones that I shall never be permitted to run the B.B.C. programmes. And perhaps, all things considered, it's just as well, for there are one or two people in the world whose friendship I really value!

So tell me if you've heard this one, instead:

There was a family who had a wireless set, and each member used to sit up in turn at night getting various stations. They bragged about their achievements at breakfast next morning—and no one believed them.

It came to Dad's turn, who wasn't an expert; and all the other members of the family were curious to know what he would say he had got the night before. Warsaw—Moscow—Timbuctoo? No, not one of them!

"Up to midnight," he said modestly, "I must admit that I didn't get very far. But I tried hard, and just before one o'clock I got —"

"Yes?" chorused the family. Their father looked at their eager faces and said triumphantly: "Thoroughly tight!"

It is more than possible that if I had to run the B.B.C. programmes I might be almost as successful.

VIVIAN FOSTER

(The Redoubtable Vicar of Mirth).

My programme would be diverse: one man's fish is another man's poison! Yes, I think so!

There would be a studio audience, creating "atmosphere," but no coughing, as good jokes are not to be sneezed at.

Wireless should be for instruction and pleasure, and the instruction itself should make for pleasure.

The deepest subjects, handled with sportive spirit, would be delightful. I always think religion one of the most joyful things in the world. It's not the parsons who want to make it dull—it's the preconceived idea of the laity to treat it with awe.

I'd have political propoganda, with all sides heard—the listener could put on the lid.

The keynote of my programme must be laughter—laughter all the way. Millions would appreciate this—some wouldn't. To gratify millions is better than to bend the knee to a disgruntled few. Yes, I think so! I think so!





BROADCAST PICTURES

For the WIRELESS AMATEUR

Straightforward Working Instructions by T. Thorne Baker, the Inventor of the System that made the Fultograph possible and Technical Consultant to the Wireless Picture Company

PHOTOGRAPHS and pictures can now be picked up by the wireless amateur, and as time goes on all sorts of pictorial diversions will, without doubt, be arranged by different broadcasting organisations.

The Fultograph, which is being used in this country by the B.B.C., and has given such successful results, has been described in this journal, but in this issue of AMATEUR WIRELESS I am giving some practical working instructions.

As described in a recent article, the system consists essentially of two metal drums revolving in exact step, or synchronism, with a stylus tracing a spiral path over the surface. On one of these, the transmitter, is a thin copper sheet on the surface of which is printed a half-tone photograph in glue; on the other is wrapped a piece of moist sensitised paper.

The function of the transmitter is to send out a succession of signals, about 350 per second, varying in duration at each instant according to the light and shade of the photograph.

The function of the receiver is to utilise the signals to produce brown marks of corresponding size upon the sensitised paper, so that a facsimile picture is built up. The Fultograph can be used with any valve set that will fully operate a loud-speaker.

Each instrument is supplied with a panel as shown above; the panel requiring an extra valve (see below) and being provided with a milliammeter, with which can be seen the amount of current being supplied to the picture machine. The drum of the receiver is rotated by means of a small spring motor fitted in the base of the instrument.

Synchronising

The receiving drum revolves slightly faster than the drum of the transmitter, so that it finishes up its revolution a little too soon. It is then automatically stopped, and only released when the drum of the transmitter has completed its own revolution.

The two drums are thus obliged to begin each new revolution in exact step, and such is the perfection of the driving mechanism that during the whole revolution the stylus of each machine is in an exactly corresponding position. The interval must not be too long between the stopping and restarting of the receiving drum; otherwise the picture will be elongated.

Assuming that the reader is intending to use a Fultograph on his own set, the following are briefly the instructions for its operation.

Connecting Up

In addition to the instrument itself, one valve is required, the most suitable being the Mullard PM₄DX. A short connecting lead is supplied which connects up the relay panel with the picture receiver; the lead is plugged into the socket on the right-hand side of the picture receiver at one end, and at the other into the socket on the relay panel marked "APP." The plug of a six-way Multiway battery lead is inserted into the left-hand socket on the relay panel marked "BATT." The lead marked H.T.+ is joined to the 90-volt terminal of the H.T. battery; this battery may be the same as is used with the wireless set. G.B.+ is connected to the grid-bias battery positive. G.B.— is connected

to the 12-volt terminal of the grid-bias battery. The lead marked L.T.— is then connected to the negative terminal of the accumulator, which is also the negative L.T. connection of the set.

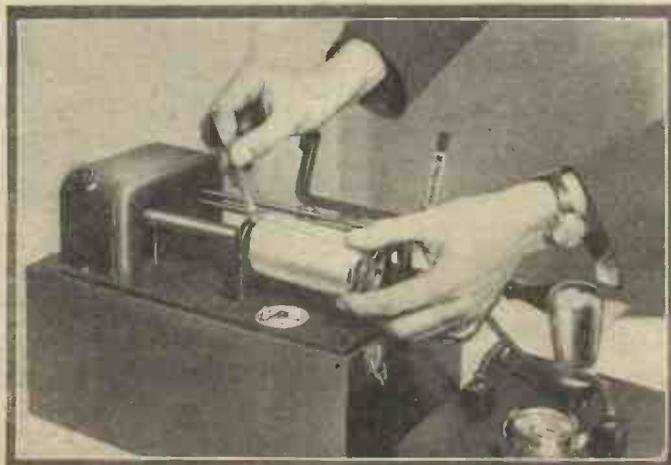
If the wireless set is run from a 4-volt accumulator, the L.T.+ lead of the Fultograph is connected to the same terminal as the L.T.+ of the wireless set. If the wireless set uses a 6-volt accumulator, the L.T.+ lead of the Fultograph should be connected to tap-off at 4 volts. If the set uses only a 2-volt accumulator, an additional 2-volt accumulator must be joined to it in series and the L.T.+ lead of the Fultograph connected to the plus terminal of the additional accumulator.

The output terminals of the set are connected to the loud-speaker and also to the two sockets of the relay panel. This connects the picture receiver in parallel with the loud-speaker, the sounds of the picture transmission being thus made audible.

Before the set is switched on, the switch on the relay panel is put to the "on" position; the milliammeter should be looked at and if the reading is higher than zero the grid bias should be increased or the H.T. voltage decreased. To satisfy oneself that the set is in correct working order, one of the leads of the grid-bias battery should be temporarily disconnected, when the pointer of the milliammeter should rise, and as it passes the figure 1 a click should be heard from the relay panel, showing that the relay is functioning properly. The grid-bias lead should then be connected up again when the milliammeter will again read zero.

All that remains to be done now is to wind up the motor and attach the sensitive paper to the receiving drum.

The arm carrying the stylus should be set so that the stylus is at the extreme right of the paper, care being taken that the guide wheel is in contact with the threaded shaft, as far as possible to the right.



The sensitised paper is secured to the cylinder by means of a clip

Immediately before the transmission begins an announcement is made, following which a tuning note is given, which lasts for two minutes. This tuning note is, of course, reproduced on the loud-speaker.

In order to tune in the receiver so that the strength is correct for picture transmission, the reading on the milliammeter should be noted, and by reducing reaction the milliammeter should be reduced to something between 2.5 and 3.

When the tuning note has ceased, three V's are transmitted; after the last V there is an interval of five seconds, and during this time the brake controlling the motor is released by raising and giving a quarter turn to the round ebonite rod on the left side of the picture receiver. The drum only begins to revolve when the correct signal is received from the transmitting station. When the picture transmission is complete it stops automatically. The speed of the motor must be such that the receiving drum always revolves slightly faster than the drum at the transmitting station. The speed should be 55 revolutions per minute. When the setting is correct, the drum, during transmission, should stop momentarily for a very brief pause, and start again once during each revolution. If the drum revolves continuously the setting is too slow.

Finishing Off

When the picture transmission is completed the drum stops automatically, and

the switch on the relay panel should be moved to the "off" position, after which the motor should be stopped by the knob



This portrait of the King was received by a member of our staff from 5XX on Nov. 26

on the left-hand side of the receiver. The paper, with the picture on it, is removed from the drum, and in order to make it

more permanent it should preferably be dried fairly quickly by holding it in front of the fire. There is little doubt but that, as time goes on, both the brilliance and the keeping qualities of the pictures will be greatly improved.

It may be said, in conclusion, that the majority of amateurs succeed the first time in getting perfectly good reception, and that the ease of manipulation and certainty of result are outstanding charms of a delightful bit of apparatus.

Next week we shall give a selection of pictures as received by us, with further practical notes.

Have you heard 2PB yet? It is the call sign of a B.B.C. mobile transmitter working on 288.5 metres. On a recent date it was in Norfolk and listeners were surprised to hear the call: "This is 2PB the British Broadcasting station at Norwich testing." As the outfit is installed on a motor lorry and experiments are being made with a view to testing out various aerial systems, there is a possibility you may hear the call on any night, anywhere!

With the Scottish Nationalist Party having come so much into prominence lately, the B.B.C. has hit upon something topical in a new series of talks under the general title, "Scotland To-day." It is intended to provide a comprehensive picture of the present state of Scotland.

For the Newcomer to Wireless: HOW CAN I GET SELECTIVITY?

I AM not very satisfied with the selectivity of my wireless receiving set; can you tell me how it may be improved?

The first thing to do is to get at the causes of unselectivity and to go for them one by one.

That seems a sound policy.

What is your set?

A three-valver with one high-frequency stage, a rectifier, and one note-magnifier.

How is the aerial coupled to the grid of the first valve?

The tuner is of the single-circuit type, both the aerial and grid being connected to the "top" of the coil.

Well, there's a point right away. The easiest way of increasing selectivity is to substitute for your present plain coil one of the X pattern and to connect the aerial not to the "top" but to whichever of the two tappings gives the best combination of good signal strength and reasonable selectivity.

Is that the best method there is?

No, you may find it a further improvement to give the aerial a very small coil all to itself. Couple this to the grid coil, but don't tune it. Aperiodic aerial coupling, as it is called, is very selective if there are few turns on the aerial coil.

Do you think my aerial is all right?

It is thirty feet high with two parallel wires.

How long is the "roof" part?

About seventy feet.

You will get greater selectivity with a shorter roof and probably you will find that you will gain in this way without losing appreciably in signal strength by using one wire instead of two. Also it is often an advantage to have a fixed condenser with a capacity of from .0001 to .0003-microfarad in series with the aerial. This reduces the effective capacity of the aerial.

How can I find the best capacity for this condenser?

Either use clip-in condensers and find by experiment which gives the best results, or fit a variable which will allow you to adjust things to a nicety.

I wonder if the coupling between my high-frequency valve and the rectifier is good enough? It is the tuned plate circuit, which I have heard is rather out of date nowadays.

It is. Probably, too, you have got a potentiometer connected to the lower end of your H.F. valve's grid coil to enable you to obtain stability.

Yes, I have.

That stability is gained only by intro-

ducing losses into the circuit; you are holding the valve down by preventing it from working as efficiently as it should.

How can I improve matters?

Use some kind of neutralising arrangement in the circuit between the first and second valves—I will explain neutralising to you another time. Meantime you will find in AMATEUR WIRELESS or *Wireless Magazine* particulars of the kind of circuit needed. Instead of semi-paralysing your H.F. valve by applying a damping positive grid bias you will find that you can give it a negative bias, which means that you are getting the fullest selectivity out of it. The alteration is usually quite easy to make in an existing set.

Anything else that I can do?

I expect you are using a grid-leak rectifier?

Yes, I am.

Well, you will find that an anode-bend rectifier is considerably more selective, though you will lose a little in signal strength unless your high-frequency stage is efficient. You can also improve matters by using high-impedance valves both for H.F. and rectifying purposes, provided of course that your couplings are suitable for their requirements.

Making A STATION-FINDING METER

WITH a complicated set a wavemeter is really essential, but it is not always realised how useful a wavemeter can be with a receiver in which there is perhaps only one tuning control.

There are several objections to relying solely on haphazard marks made on the tuning condenser scale with a set on which a large number of stations can be received. The most obvious snag is that if the aerial, coil, detector valve, or battery values are changed the settings may not be true.

One of the difficulties usually associated with an amateur-made wavemeter is that of calibrating it, but in this instance calibration is not strictly necessary if the instrument is made up exactly as described.

A wavelength-dial-reading graph has been prepared for this wavemeter at the Furzehill laboratories of our Technical Editor, and this can be used with any wavemeter which is made up exactly according to these instructions. This graph is given on page 1002.

Components Required

.0005-microfarad square-law variable condenser (J.B., Cyldon, Burton, Polar).

Ebonite panel, 9 in. by 6 in., from which a 2-in. by 6-in. strip is cut for the coil-support panel (Becol, Raymond, Ebonart).

Coil former, $2\frac{5}{8}$ in. long and 3 in. diameter (Atlas, Wearite).

Two coil pins and sockets (Clix).

2 oz. No. 24 d.c.c. wire (Lewcos).

Dial indicator (Bulgin).

18 in. of thin flex (Lewcoflex).

Quantity of $\frac{5}{8}$ -in. thick wood for cabinet.

The most important constructional feature is, of course, the coil, and this must be made up as described. It consists of 55 turns of No. 24 d.c.c. wound on a thin insulated former 3 in. in diameter and $2\frac{5}{8}$ in. long. Actually the winding space occupies $1\frac{7}{8}$ in., and this leaves "margins" of $\frac{3}{8}$ in. Two contact pins are mounted on the

former, one on each side, and two small holes are drilled at each side through which the ends of the winding can be threaded to secure them.

Further to secure the turns, the coil should be lightly "doped" with collodion. This renders the cotton insulation impervious to atmospheric moisture, and the celluloid forming the basis of the collodion does not seriously interfere with the natural capacity of the coil. Shellac should not be used if it is desired



The Complete Meter

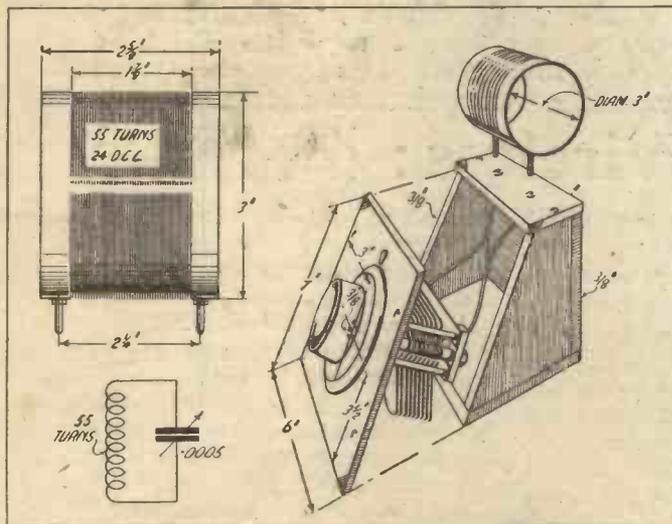
to work the meter with the calibration chart shown, for shellac increases the turn-to-turn capacity.

Two sockets for supporting the coil are placed on the small ebonite strip forming the top of the meter case, and flex leads are taken from these to the condenser terminals. These leads should be as short and direct as possible. A sharp-pointed dial indicator should be fixed to the panel as shown, so that dial readings can be spotted with accuracy.

If the coil is not made exactly as described, or a variable condenser of different maximum value is employed, then the meter will need to be calibrated before it can be brought into service. A calibration check should be given, in any case.

Choose two stations which can be received at good strength. Bring the wavemeter into resonance with the receiver when each station is being received, and note the wavemeter condenser reading on each occasion. Verify the stations' wavelengths from the AMATEUR WIRELESS Broadcast Telephony List and then plot a graph of dial readings against wavelengths,

(Continued on page 1002)

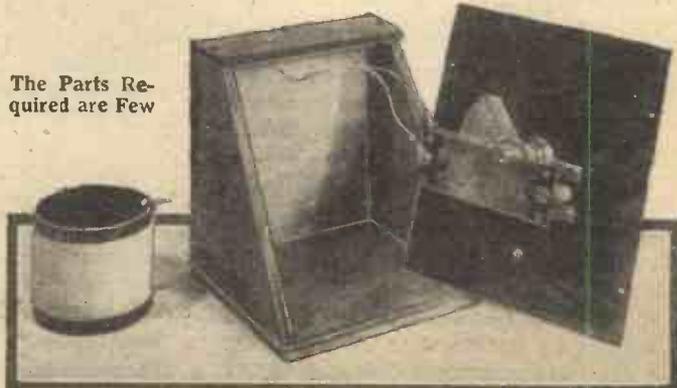


The Constructional Details of the Meter

A wavemeter such as this, of the absorption type, is simplicity itself to operate and is used in conjunction with a receiver in the following manner. The meter case is placed adjacent to the tuning side of the receiver, and a station, the wavelength of which it is desired to check, is tuned in at maximum strength. The dial of the variable condenser in the wavemeter is then slowly rotated until a faint click is heard in the phones or loud-speaker, and there is a slight diminution of signal strength.

This indicates that the wavemeter is exactly in tune with the receiver, and the station's wavelength can be located at once by referring to a simple graph which gives the wavelength readings corresponding to dial settings.

The Parts Required are Few



IN PERIL AND IN PLEASURE

Now if the Exide Battery is used —as it is used—where the behaviour of the battery is a matter of life and death. If the Exide Battery is found—as it is found—in the Marconi Station on the coast and in the wireless cabin at sea. And if the Exide Battery

soars with the aeroplane and submerges—as it does—with the submarine—does it not follow that you, installing the Exide Battery in your own wireless set, are following the highest scientific example and making sure of the finest musical results?



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On Your Wavelength!

Relics of the Past



Do you ever go through your "junk-box," you who are old-stagers in wireless? I went through mine the other day, and it had all the exciting interest of a geological excavation. The lowest strata gave up two old Marconi variable condensers in ebonite boxes, with thin ebonite leaves between the plates. They were of not maximum capacity, and quite useless according to modern ideas; but they are beautifully made and of "pre-war" brand. Next to them was a rather more modern "fossil" in the shape of a soft Dutch valve, with which remarkable feats of long-distance reception used to be done. Then there was a test tube filled with many different kinds of crystals, which brought back many memories, amongst them the reception of one of the very earliest transmissions of the Glasgow station—on a crystal without amplification, in the heart of Surrey. There were "spiders" galore. Not the living sort, but those many-legged wire things on which we used to wind our coils.

Neither Quality nor Quantity



The most interesting discoveries, though, were my two first radio-frequency transformers and the remains of an old "Mark III" note magnifier. These were used early in 1922—before ZLO started up—to get the "Dutch Concert" and to listen to P. P. Ekersley making fun of the world from W-r-r-r-r. With two H.F. stages, a detector, and three L.F. stages—all "R" valves, if you know what they were, gentle reader of more modern vintage—we really could hear those Dutch concerts on a home-made loud-speaker, provided the room was quiet! And the quality? Well, well! They were great days; but I don't think I would like to go back to them.

Police Broadcasts



On Thursday, November 22, the Scotland Yard authorities for the first time used the broadcasting service in their search for an important witness concerned in a recent murder. Although, on various occasions, descriptions of missing persons have been transmitted to the general public, it is the first time in this country on which the police have called in the help of the B.B.C. for assistance in the elucidation of a criminal problem. The idea, however, is far from being a new one, as on the Continent for over a year the Hilversum station in Holland has broadcast daily a police news bulletin, and nightly the German trans-

mitters put out announcements handed to them by the local police stations. If you listen to Hamburg in the course of the news transmission, you will hear in it sundry references to wanted criminals or descriptions of stolen motor-cars and other property.

On two recent occasions similar transmissions by Langenberg and the Rhineland studios resulted, firstly, in the capture, within six hours, of a particularly brutal murderer and, secondly, in the discovery of the whereabouts of two criminals from a penitentiary, thus leading to their re-arrest without delay. With the advent to-day of picture transmissions, some considerable development of this feature may be expected.

The Long-wave Troubles



From the recent excitement which has taken place on the high waves, it is difficult to gather whether the stations have been playing at General Post or Tom Tiddler's Ground; but, so far as I can judge, the sport indulged in has not yet reached the finals. It all arises from the fact that it is impossible to put a quart in a pint pot, and the logical sequence and development of the decisions taken at the last Washington Conference, whereby "umpteen" high-powered transmitters are to be lodged within the boundaries of a comparatively small waveband! The result is a healthy crop of heterodynes and general interference. The Danish high-power relay Kalundborg, apparently, was not allocated any position whatever, and for a few weeks jumped the 1,680-metre wave, thus obstructing Zeesen, which, in its anxiety to avoid the usurper, clashed with Daventry 5XX. To-day the Dane has abandoned this position, reverting to 1,153 metres, to which there is no objection, although the wavelength is not designated to a broadcasting station.

Many Changes



In the meantime, further changes have been carried out, namely, Huizen from 1,870 metres has come down to 1,852 metres and Daventry to 1,562.5 metres, thus reducing its distance from Lahti, which during the past few days has been working on 1,503 metres. Trouble in the long waveband is by no means at an end with these alterations, for into this section we must note the arrival of Angora, on 1,600 metres, and Eiffel Tower, testing on 1,480 metres. Whether the French station will remain there is a moot point, for 1,483 metres (202.2 kc.) was the position given to Moscow in the original scheme.

On the Medium Band



To the already congested medium broadcasting band we record the arrival of Genoa, on 403 metres, San Sebastian in its immediate neighbourhood, roughly 400 metres and Madrid (Union Radio) EAJ7, which lately has lodged itself on 434.8 metres—immediately below Frederiksstad, with which on some nights it heterodynes.

Although some transmitters conscientiously maintain their exact wavelengths, this laudable quality does not apply to many, as may be noticed on evenings when PTT (Lyons), increased in power to some 5 kilowatts, interferes in turn with Berlin and Langenberg. Daily more stations are being added to the already unwieldy European list of broadcasters, and notwithstanding the fact that the number of programmes simultaneously on the air increases weekly, there are but few which can be held by the listener, without interference, for any reasonable time.

S O S



During the last few weeks hundreds of lives have been saved at sea through the agency of radio. The whole world has recognised its importance and has paused in admiration of the men who tap out the messages for succour. It seems strangely inconsistent, therefore, that wireless operators, as a whole, are very poorly paid and that the gear they have to work is, for the most part, absolutely out of date. The great Atlantic liners and other first-class ships have very fine wireless equipments and adequate staffs of operators. But the majority of ships, many carrying passengers, have only one operator, and antiquated transmitting and receiving equipment. Transmitters are largely of the "spark" type, covering a large band of wavelengths and causing a good deal of jamming with other ship and shore stations sending out on adjacent wavelengths. Such jamming is, of course, an advantage when an S O S signal is being sent out, for a broadly transmitted signal is much more likely to be heard than a sharp one. But when other messages are being sent on a spark transmitter the jamming may interfere with the reception of distant S O S calls.

That "Spark"!



All broadcast listeners who live near the coast have reason to be well acquainted with the spark transmitter! North Foreland, Cullercoats, Newhaven, and other "spark hounds" buzz through many a loud-speaker which is trying to "deliver the goods"

On Your Wavelength! (continued)

from 5GB. Most of this "traffic" could quite easily be carried out with valve transmitters, if the ships had something better to receive on than a crystal. Yes, sir, I said a *crystal*! And if an operator dares to bring his own broadcast receiver on board for use in preference to a decrepit old ship's receiver, the wireless company's inspector frowns upon the enthusiast and possibly gives him "the sack"! By such methods as these are dividends paid! Scrap the "spark," except as an emergency transmitter, and scrap the out-of-date receivers, too! If the same imagination and enterprise was turned to this side of radio as in the broadcasting section, more lives would be saved and less risks would have to be taken by radio operators.

"Caravan"



Cecil Lewis has done it again! *Caravan* was a rather theatrical effort with a weak ending, yet it was none the less interesting. I'm not so sure that the play could be called entertainment for the masses, action being rather on the slow side and thrills being entirely absent. There were many good lines, however, and the fine voice of Frank Petley, who played the part of the merchant, Garilan, sounded very well on my loud speaker. I hope it won't be the last time I hear his fine voice via radio.

A Queer Experience



My short-wave set went on strike the other day, signal strength being very feeble and the reaction control having none of its usual silky smoothness. As a matter of fact, I had noticed that all was not well for some little time, but I had failed to find any reason for its not being quite up to the mark. When, however, reception became really bad I spent an evening investigating matters. The rectifier circuit is arranged with the grid leak and condenser in parallel, the low-potential end of the grid being connected to the slider of a potentiometer wired across the L.T. busbars. Thinking that the grid-leak might be faulty I removed it, intending to try another. Whilst it was still out I happened to turn the knob of the potentiometer and found that so doing had a big effect upon the rectifier's performance.

An Explanation Wanted



Since a fat shunting condenser was used between the slider and L.T.—, this could only mean that it still affected the grid potential and the obvious deduction was that the grid-condenser had broken down. On pulling it out and substituting another, the set at once returned to its normal good behaviour. Now what I want to know is this. The D.C. and A.C.

potentials across that condenser were tiny; it was of excellent make; how on earth did it come to break down? Is it possible that the enormously high-frequencies that are dealt with when one goes down to wavelengths of 10 metres or below have destructive effects that are not yet fully realised? I can see no other reason at present to account for the failure. Can any reader suggest one?

Short-weight Batteries



Those who seek to economize by the purchase of cheap foreign high-tension batteries not infrequently come to wish that they hadn't. I have had one or two through my hands lately that have proved a revelation. One of them is really highly ingenious. It is beautifully got up with a very pretty case and a nice shiny black top. In length and breadth, and height, and weight, it conforms approximately to the usual standards. Still, for all that it is a short-weight battery as I will explain.

After opening the case I found that the cells within, though of the same diameter as those generally used in standard batteries, were about half an inch less high. Further, the zinc pots were not filled right up. The required height and weight had been obtained by the use of a thick bitumen seal and of a cardboard packing over the tops of the cells. Electrically these cells are just about half the size in a normal battery and tests soon proved that it had about a quarter the ordinary useful life. Those who buy such things are far from saving money. Still I suppose that they cannot really complain for they get what they pay for.

False Economy



Quite a number of people that I know make use of ordinary flashlamp refills for building up their high-tension batteries. The idea is at first sight an excellent one, since "dud" bits of the battery can be removed and renewed from time to time with a minimum of trouble and expense. But there is rather a bad snag. The average refill is not designed for the kind of work that it has to do when it is made to form part of a plate battery. Often its insulation is not good enough for the job. If you want to build up unit batteries you should always use not flashlamp refills, but units designed specially for the job.

These are made by numerous firms and they cost little, if any, more than ordinary refills.

Special Types Required



They have, too, another great advantage. Using flashlamp affairs, you must either solder the long strip connection of one unit to the short strip of the next, so as to wire them in series, or must make use of special clips for the purpose. Units designed for H.T. battery work are generally provided with special time-saving connectors. One pattern has spring clips for both positive and negative connections, and units are easily joined together with short pieces of bare wire. In another type the positive connection has an ordinary wander-plug socket and the negative a rubber-covered wire provided with a wander plug. With these the process of building up a battery is simplicity itself. Another good tip is to use not three-cell units, but specially designed single cells for making up an H.T. battery. These again, are obtainable from numerous makers, and they can be purchased in a variety of sizes. Some have screw terminals, others clip contacts, and others again plugs and sockets.

Watch the Insulation



But, whether you use units or single cells, you should always be careful to house your battery in a suitable container. Don't jam units or cells tightly up against one another; leave a space between them. And don't forget that it is of the utmost importance to insulate the bottoms of the cells properly. One of the best tips that I know is to have a sheet of glass cut that will just fit into the battery box. Stand the units or cells on this with plenty of space between them, and you will find that your battery lasts longer and gives quieter working than if you lumped them together with nothing but cardboard or soft wood to stand on.

A Grid-battery Tip



Here is a tip which I have found exceedingly useful. A 4B.A. tap can be turned easily into the average socket. It does not give a full thread, but it makes one quite deep enough to enable a screw to get a respectable grip. Tap each of your sockets and screw in a small piece of studding, locking each with a nut. You can then make secure connections, slipping the ends of your grid-battery leads over the appropriate studs and fixing them firmly with nuts. It does not take very long to carry out this little job, and it is very well worth while, for it removes a potential cause of noisiness and makes one pretty well secured from grid-battery troubles.

NEXT WEEK :
A SHORT-WAVE
LOUD-SPEAKER TWO

Captain Round on THE FUTURE OF THE MAINS SET

THE last word has not yet been said on the design of sets to work off the A.C. mains. The whole problem bristles with difficulties, both for the home builder and for the manufacturer. The latter has a really difficult proposition in England, for not only has he to contend with the two ranges of wavelengths—that is, from 200

ease greatly the valve manufacturers' difficulties.

Unfortunately, 2-volt filaments are not quite suitable for A.C. mains working, the hum being evident, particularly when a moving-coil loud-speaker is used.

A series of .8-volt valves has been issued which satisfactorily solve the A.C.

hum problem, except as regards the rectifier.

The other solution is the independently heated cathode valve which, at a price, solves all the difficulties, and, in general, one of this type of valve must be used for the rectifier, even if the .8-volt filament valves are used elsewhere.



TWO EXAMPLES OF MODERN CURRENT SUPPLY A.C. MAINS UNITS

(Left) the Cosmos.
(Right) the EKCO



to 600 metres and from 1,000 to 2,000 metres, with all the attendant switching difficulties—but he has to cater for different voltages and frequencies.

Why American Sets are Cheap

One often marvels at the small price of American sets; for instance, I know of one 6-valve set selling without valves for £16. It is a very sharply tuned set with single control and includes the whole of the gear for running from A.C. mains.

Now, this set can be produced at such a low figure because of the practical uniformity of A.C. supply in America. The fact that a very large percentage of the population has mains supply makes production on a large scale possible.

Why English Sets are Expensive

In England it is a very different matter, as the set must be adaptable to different classes of power and the market is very much smaller. We have, therefore, to be content with simpler sets. No one sees a real way of getting rid of the double range of wavelengths, but an effort can be made to standardise power units to some extent.

The Varieties of Power

The supply of H.T. is comparatively easy; the use of either dry cells, D.C. mains, or A.C. mains does not necessitate changes in sets or valves. It is only the filament lighting part of the game that causes complications. I have advocated for some time now a concentration on the 2-volt type of valve for all battery-supplied sets, and although one would prefer, perhaps, 6-volt valves for the last stage, and for heating from D.C. mains, this would

OUR CHRISTMAS COVER

A cover should speak for itself—and ours does. But I may be allowed a word or two of special explanation.

The "people at home" at Christmas are shown looking into a combined telephony and television cabinet, which in itself is both transmitter and receiver. Surmounting the cabinet is the fret of a loud-speaker and in front, below the screen, is a lens forming part of the television transmitter. Speech and music come in from the uttermost parts of the world, and in full colour on the glass screen the "people at home" see their own "son of the house" whose duty has called him to the far-away places of the East. They not only see him and hear him, but in addition, they read his Christmas message which spells itself out to them in the slot at the top of the screen.

And HE sees them, too, in HIS transmitter-receiver. And so those at home and the man at the other side of the world bridge the distance between them in an instant.

Just an interesting and amusing idea—and nothing more will it be for a very, very long time; but he would be a rash man who would dare to say it is outside all possibility.

WHERE'S THE FALLACY?

Frankly, though, there is one thing about our picture that apparently is quite impossible and we were inclined to condone it because we would rather ask our readers' indulgence than spoil the effect of the picture.

Granting the possibility of the radio and other electrical phenomena involved, what is the outstanding fallacy to be found in the picture? We will send a cheque for One Guinea to the writer of the FIRST letter opened by us on Monday, December 17, that correctly explains the mistake. Keep your letter short: fifty words is ample, and twenty-five can be made to serve. Please address your letter:

"CHRISTMAS COVER,"

The Editor,

"Amateur Wireless,"

58/61 Fetter Lane,

London, E.C.4.

No letter so addressed will be opened before 11 o'clock a.m. on the date mentioned.

THE EDITOR.

Let us see what all this means from the designer's and manufacturer's point of view.

Difficulties of Set Design

The manufacturer has to make a set which will work satisfactorily on, say, 2-volt valves, with one .8-volt I.H.C. rectifier, or on all I.H.C. valves. Even if the set is not a neutrodyne the chances of ever getting ganging arrangements and stability to fit other changes of valves is small.

D.C. Mains

I am leaving out of the question any demand for series lighting from D.C. mains. D.C. mains lighting is a matter for a trickle-charger battery. Direct lighting from D.C. mains is attractive, but there is no satisfactory solution of the problem, particularly with sets with five or six valves.

It tends to introduce H.F. reaction and thoroughly tangle up the grid-bias question. And D.C. mains, being on the wane, should not be excessively catered for. A trickle charger, then, or, if the user doesn't mind high consumption, by breaking down the volts with a lamp or a rheostat, are the only ways of handling D.C. filament lighting. Of course, H.T. supply from D.C. mains is quite simple, providing care is taken to prevent motor-boating; and the same care, of course, must be taken with A.C. H.T. work.

My Own Set

It may interest readers to know that I have at my house a Marconi 6I receiver,
(Concluded at foot of next page)

Programme Limericks



HIS OPINION

Mr. Highdome, who thinks he's all brain,
Grinds his teeth when they switch on Jack Payne,
And he says with a curse,
"This is certainly worse
Than that falsetto chatterbox, Jane!"
G. GERRISH.

MOSELEY (AGAIN)

De Courville and Charlot morosely
Perused "Weekly Comments" by Moseley;
Said Albert: "I'll bet
Something's wrong with his set,
For our efforts don't get through jocosely."
C. H. STURGES.

HOT

Wrote a listener: "Your programmes to me
Are old-fashioned and dull. Will you see
They are brought up to date
(To A.D., any rate!)
As a change they'll not then B.B.C."
A. LOVEJOY.

NOT YET!

The dull radiation from our local station
Upon my intelligence jars;
So I'll alter my range
(Just by way of a change)
And receive S.B. items from Mars!
J. J. KEEFE.

REALLY?

A senile old farmer named Vaughan
Said: "I listens each night till the daughan,
For they radio jokes
Makes Oi laff till I chokes—
For I heered 'em all 'fore I were baughan!"
CHARLES P. PARSONS.

DISILLUSION!
What's on? Talk on "Hygiene"?
How bright!
Then an "Orchestral Concert"
(termed "light"!),
And a "French Talk" to swallow,
"Shipping Forecast" will follow—
Oh! Good-night, everybody! Good-
night!

With this clever Limerick Miss Violet Broxholme, of 31 Cambridge Road, Southend-on-Sea, wins the First Prize of 3 Guineas of our Limerick Competition. The senders of all other Limericks we print will each receive a prize of a valve of one of the following makes: Mullard, Osram, Marconi, Ediswan, Six-Sixty, B.T.H., Cossar.



Says father: "That fellow Jack Payne
And his dance band are at it again.
I'll sell the whole set!"
Says his daughter: "Not yet!"
As she joins in the jazzy refrain.
H. WALLACE.

SAD
There once was a young cook named Lessing
Who voted the wireless a blessing;
But o'ercome by a ballad
She collapsed in the salad—
Now listen she can't, for she's dressing!
CHARLES P. PARSONS.

POSSIBLE!

"This music's divine!" murmured Glupp.
"A symphonic poem!" said Thrupp,
"But who's the composer?"
"There ain't one," said Tozer,
"It's the orchestra just tuning up."
PATSY PAYNE.

MIXED

"Mixed programmes" I always can get,
For I've just bought a cheap super-het.;
Most B.B.C. stations,
With stray oscillations,
Come in all at once on my set!
J. J. KEEFE.

MARS

The programme? Yes, sometimes it jars,
Many talks very often it stars;
So many we've had
That one bright, brainy lad
Reached out for a message from Mars!
THOS. G. CHILDS.

BITTER

When we're freed from the day's toil and strains
We switch on for some charming refrains;
Then we hear that sweet voice
Say: "We'll now broadcast the noise
Made by lorries, and hooters, and trains."
ERNEST A. VAUGHAN.

"MORE PROGRAMME LIMERICKS"
on page 986

CAPT. ROUND ON "THE FUTURE OF THE MAINS SET"

(Continued from preceding page)

consisting of three screen-grid valves—anode bend detector, followed by two R.C. coupled stages—running satisfactorily entirely off the D.C. mains.

The mains supply has been adapted without altering the receiver, and there is no hum. This is all by the way, and I will now go back to the general problem.

Granting that there is no need for any valve changes between batteries and D.C. mains, the voting is two to one against the A.C., and we must look for a method which brings A.C. into line with other sources of power.

Copper Rectifiers and Electrolytic Condensers

The recent introduction of the copper-oxide rectifier and, still more surprising, electrolytic condenser (I mean in its present simple form) seems to me to

indicate a way of standardising which we should be foolish not to look into. So far, I have no practical experience of either the rectifier or condenser; but as they are quite reliable, the continuation of the .8-volt or I.H.C. practice is not right.

One or two rectifiers in parallel and shunted with a 1,500-microfarad condenser should provide suitable rectification and smoothing for any set, with a power consumption far below that of the other methods. The filaments would, in effect, be lighted by D.C.—and can be



An Electrolytic Condenser

treated as such—and the set itself need differ in no way from the battery or D.C. mains set.

This system would also be a great advantage to the home constructor, because it gives him a set capable of being taken from place to place and does not limit him to his home current.

Here we have a method in sight which for a long time to come should suit the British conditions, and even if the initial cost is more (which I believe it will not be), there should be an enormous saving due to standardisation of set units.

The manufacturers will be able to concentrate on one straightforward set and, what is more, the valve makers will be able to specialise with fewer types of valve. Sets will, therefore, be cheaper, and valves will be cheaper and more reliable.

Station WCFL has purchased a 100-acre farm twenty-two miles directly west of Chicago for the location of its 50,000-watt national super-power station.

NEXT WEEK: THE TALKING FILM—A NEW FIELD FOR RADIO

Reliable Resistances result in Rich Reception

The most perfect form of Coupling between Stages

Lowest in Cost due to 'Met-Vick' Moulded Resistances



MET-VICK COUPLING UNITS

complete for

5/-

MET-VICK DETECTOR UNITS

complete for

2/6

MET-VICK MOULDED RESISTANCES

Anode & Grid Leak for

1/2

The results obtained from Met-Vick Skeleton Resistance Units cannot be improved upon, even by using expensive wire-wound resistances. The values of the components have been carefully calculated to give maximum amplification per stage and as moulded resistances and leaks are used, their values are retained indefinitely and they are noiseless in operation. List MS 4761

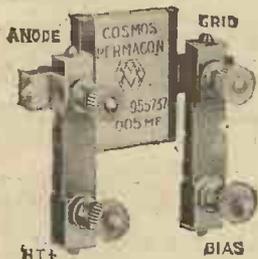
The use of moulded resistances in 'Met-Vick' Skeleton Detector Units, ensure freedom from 'rushing' noises often experienced with surface deposit leaks. Both the condenser and the grid components retain their original values, quite unaffected by climatic or other variable conditions.

Similar to those embodied in the Coupling and Detector Units 'Met-Vick' Moulded Resistances are available as separate components. They are chemically inert, the entire material being the actual resistance element. They

1. Carry heavy currents 5-10 milliamps without becoming noisy.
2. retain their values
3. Are non-inductive. They are ideal and inexpensive.

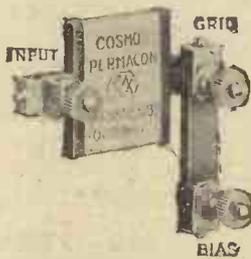
List MS 4761.

List MS 4760



Met-Vick Skeleton Resistance Coupling Units for Mains Operation with Met-Vick A.C. Valves:—
 Anode Resistance 200,000 ohms }
 Grid Leak 1 megohm } **5/-**
 Coupling Condenser '005 mfd. }
 Extra for Moulded Base . . . 1/3

Similar for Battery Operation:—
 Anode Resistance 400,000 ohms }
 Grid Leak 2 megohm } **5/-**
 Coupling Condenser '005 mfd. }
 Extra for Moulded Base . . . 1/3



Met-Vick Skeleton Detector Unit for Mains Operation:—

Grid Condenser '0003 mfd. : } **2/6**
 Grid Leak 1/2 megohm : : } **2/6**

Similar for Battery Operation:—

Grid Condenser '0003 mfd. : } **2/6**
 Grid Leak 2 megohms : : } **2/6**

Extra for Moulded Base . . . 1/3



Anode Resistances:—			
100,000 ohms	-	-	1/2
250,000 "	-	-	1/2
500,000 "	-	-	1/2
Eliminator Resistances:—			
25,000 ohms	-	-	1/2
50,000 "	-	-	1/2
Grid Leaks:—			
1 megohm	-	-	1/2
2 megohms	-	-	1/2
3 "	-	-	1/2
Clips for mounting	-	-	1/3

MET-VICK Components, Valves and Sets

Metro-Vick Supplies Ltd., 155 Charing Cross Road, London, W.C.2

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention

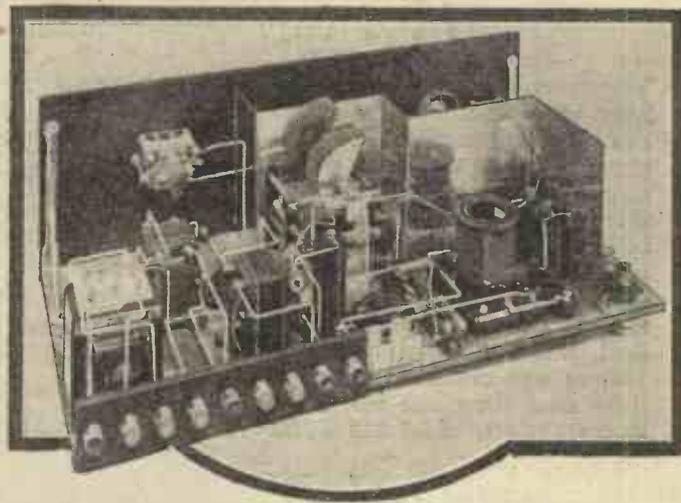
The Furzehill Four



by
J. H. REYNER, B.Sc., A.M.I.E.E.

A new one-dial all-wave receiver, comprising screened-grid high-frequency amplifier, anode-bend detector and two stages of transformer-coupled low-frequency amplification, fully described in **WIRELESS MAGAZINE** for December, now on sale, 1/-

Other Contents Include:
HOW TO RECEIVE WIRELESS PICTURES: All you want to know about the apparatus and how to use it to enable you to receive pictures. **GRAMOPHONE THREE**, combined electric gramophone and 3-valve broadcast receiver. The **SPECIAL ONE**, simple set for head-phone reception. How to make Coils for the "Touchstone." Dr. N. W. McLachlan on Loud-speakers. Hints on the Linen-diaphragm Speaker. Special Articles by Capt. Round and W. James.



Thirty-eight stations have already been received at full loud-speaker strength

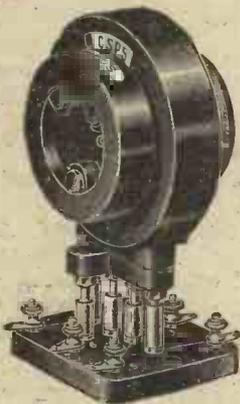
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Interchangeable reaction coil (if required) 3/- extra

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Interchangeable Primary Coil 3/-
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Interchangeable Primary Coil 4/-

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Obtainable from all dealers and

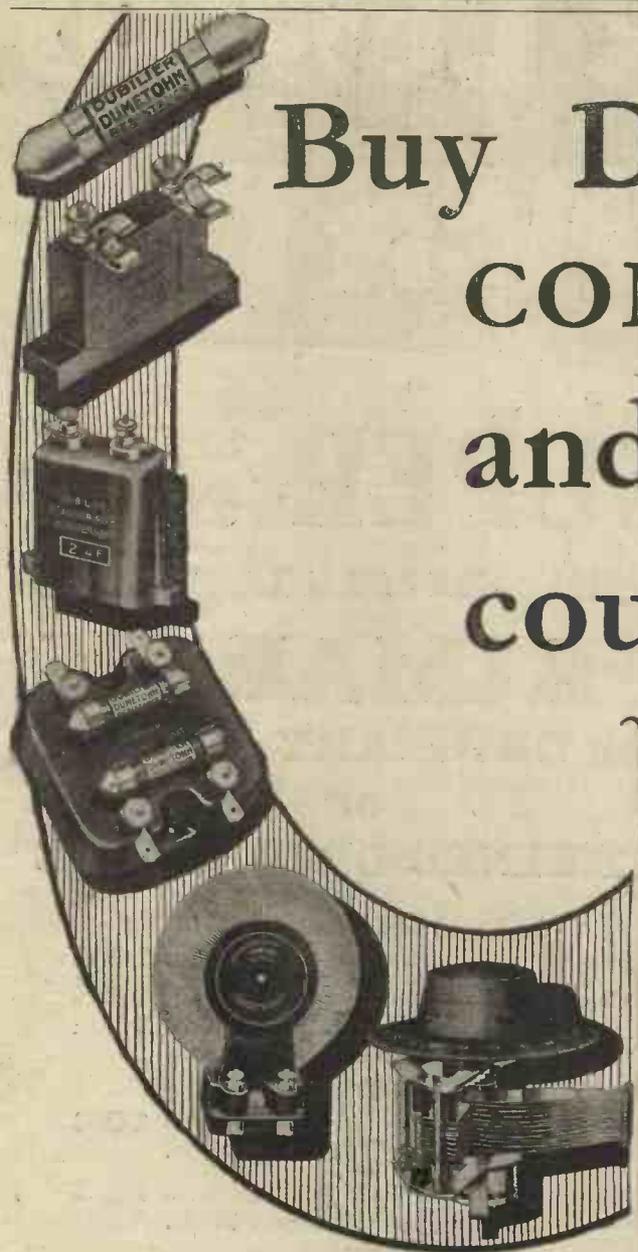
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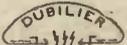




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recurring
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DUBILIER
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Advt. of Dubilier Condenser Co. (1925) Ltd.

Ducon Works, North Acton, W.3.

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You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers



Send this XMAS CARD to Your Friends

Here is an opportunity to send your friends a Christmas greetings card which is both novel and unique, and which will afford them an agreeable surprise and much amusement during the festive Christmas season. It is, however, more than a novelty, it is a crystal set and, moreover, it works.

The Front Card

Paste one of the paper pieces on to one side of one of the cards, then insert one of the coils in the recess formed by the circular cutout. On the edge of the card fix two metal tags as shown and at one corner punch a small hole for the purpose of pivoting to the back card. Connect the beginning of the coil winding to both of the metal tags by soldering or securing under the tag. The other end of the coil winding is taken to the pivot when the two cards are joined together.

The Back Card

On the outside of the back card paste one of the paper pieces and place the second coil in

condenser spacer washer and into this is secured by means of woods metal a very small piece of crystal. A fine wire is taken from tag Y which terminates in a small catwhisker contact to the crystal. The beginning of the coil connects at the point where the cards are pivoted. Before going any further paste a piece of paper over each of the cards thus entirely concealing all the connections and coils, but leave a piece of wire projecting from each of the coils to make the pivot connection.

The two cards are pivoted together by means of a small screw and nut and each of the wires from the coils are placed between washers between the cards to ensure good contact and to prevent them from breaking. Our Christmas card is now complete.

The artistic member of the family now has an opportunity to shine by painting some pleasing design on the front of the card, or failing this, one could be pasted on from a suitable print.

The following doggerel can also be put on:

Fix me to an aerial,
Put me on an earth,
Give to me a pair of phones,
I will give you mirth.
Open me until you hear
The strains of music sweet
Coming through from far and near.
It is a wondrous feat.

Using the Card

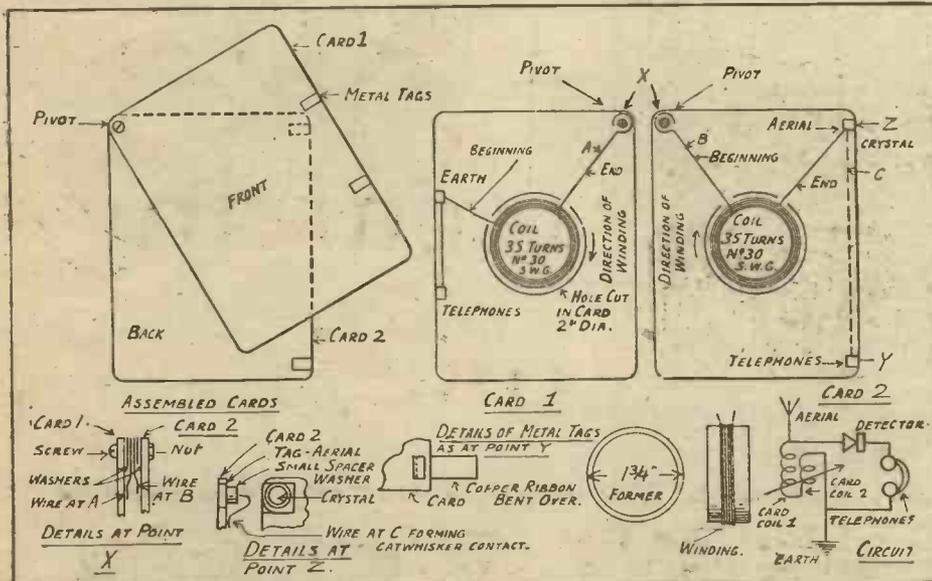
This poetic outburst really explains how the card is used, for all that it is necessary to do is to join the phone across the tags marked so and gently rest the crystal contact on the crystal. The card is tuned by simply slowly opening the cards until signals are heard.

This novel Christmas card costs practically nothing to make and is most appropriate at the present season.

A dispatch from Shanghai states that the Chinese Minister of Reconstruction for the Nationalist Government, Chang Ching-kiang, and Mr. A. B. Tyrell, representing the Radio Corporation of America, have signed a ten-year agreement whereby radio stations recently contracted for in China will be operated in co-operation with stations in North America, South America, the Philippines, and some parts of Europe. It is expected that the new stations will be completed in eighteen months.

THIS really original novelty presents no difficulty to construct, providing the details are carefully followed. The fact that wireless signals can be received upon it or that it is a crystal set is quite disguised, and much wonder will be caused by those who receive one as to how it works, for the tuning coils are cleverly concealed in a most inconspicuous manner.

First cut two pieces of card rectangular in shape measuring about 3 in. by 4 in. and in the



Here are the details of the Christmas Card Crystal Set which is within the ability of anyone to make

centre of each make a circular cutout 2 in. in diameter. Next cut four pieces of paper to similar dimensions.

The Coils

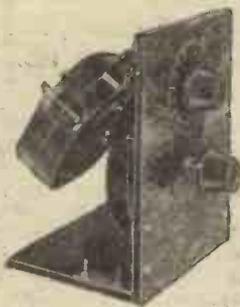
The coils are wound in hank formation and No. 30 s.s.c. wire is suitable. There are two coils, each consisting of 35 turns and each may be wound around a former 1 3/4 in. diameter and then slipped off when finished and bound with cotton. Now we can complete the front card, complete details being shown in the diagram.

the circular recess as before. This card is also equipped with two metal tags and the end of the coil is connected to the one marked z. At the back of the card on the tag is soldered a small

FOR THE AMATEUR—
Letts' 1929 Amateur Wireless Notebook
Diary—contains an 88-page Reference
Section and all useful data, circuits, etc.
1/6 A FINE XMAS GIFT! 2/6

Make it a Wireless Gift!

Wireless has Solved the Christmas Presents Problem! The Suggestions Contained in these Pages Will Help You to Give Just the Gifts that Will be Appreciated.



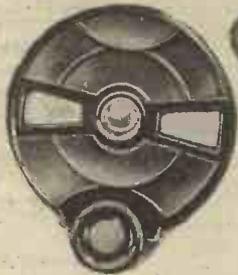
The Tunewell all-wave tuner, illustrated on the left, will be very acceptable to anyone about to make a receiver. No other coils will be required. Reaction is controlled by a knob on the panel. It is only 13s. 9d.



On the right is the Philips Septagonal loudspeaker, which is excellent value for only 50s. It will work well with a two- or three-valve receiver; quality is good.



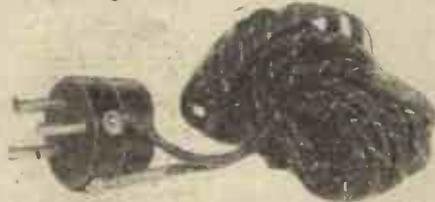
If you know any listener who does not use slow-motion dials, here's your chance to do a good turn. The Polar dial on right is 3s. 9d.; motion is smooth and dial clearly marked.



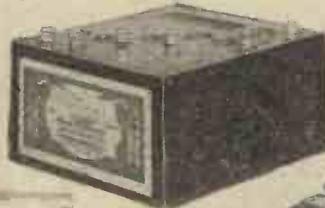
Here, above, is a really ideal gift. The Formo two-stage L.F. (R.C. and transformer) unit is a third of a receiver. As can be seen, it is very neat and all ready for connecting to the valves. Price 30s.



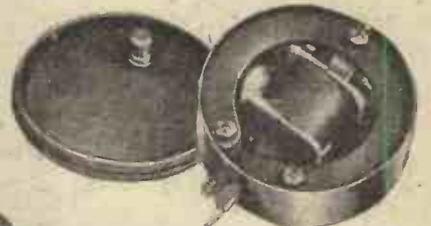
Valves—have you thought of these? Why not one of the new pentodes or a screen-grid valve? There are also indirectly and directly heated A.C. valves worthy of consideration. Obtain the makers' lists.



Gramo-radio holds great possibilities for the listener. Above is shown the Burndept pick-up adaptor, which simply has to be plugged into the detector valve holder. No alterations to the set are necessary. Price 4s.



Columbia batteries are famous for reliability and long life. The 60-volt battery (triple capacity), as illustrated, is 20s. and the 45-volt is 16s. 6d.



Above is shown Marconiphone Company's electric gramophone pick-up. If you know any music-lover who possesses gramophone and wireless, give him this—he will be your life-long friend. It is 50s., but worth it!



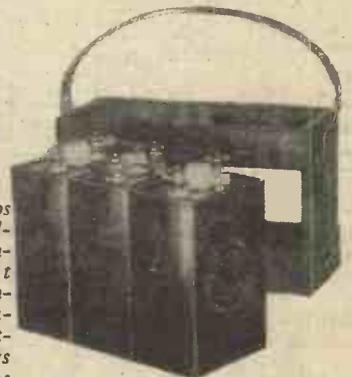
The Philips trickle charger shown above enables one to charge the L.T. accumulators at home. By an ingenious device, charging is done automatically.

Anti-microphonic valve holders are really essential. Old ones of the other

A measuring instrument is the ideal toy for a wireless man; its uses are scrapped. The many and valuable, too. It tells just what is taking place in the set. The handsome milliammeter shown above should supplant is marketed by A. H. Hunt at 35s. them. Price 13s.



Above is a Lewcos H.F. choke—a well-designed, well-finished component which can be recommended with confidence. The inductance of the windings is ample, but, by the design of the instrument, capacity is kept at a minimum. It is priced at 9s. 6d.



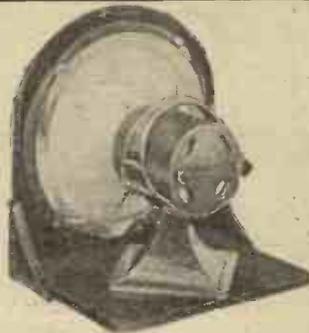
Accumulators! (You might like to make yourself a present in this kept at a minimum. line!), among which C. A. Vandervel's are prominent.

More Gifts on Page 964.

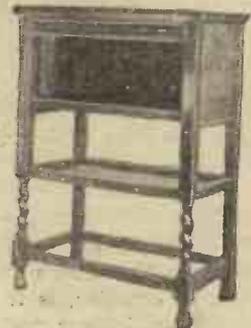
MAKE IT A WIRELESS GIFT! (More Gifts on page 964)



Here is the perfect inexpensive gift. The Letts' "Amateur Wireless" 1929 Diary contains all the wireless data the listener wants, besides several little articles on circuits, aerials, etc. It is invaluable to the amateur. Prices 1s. 6d. and 2s. 6d., from this office.

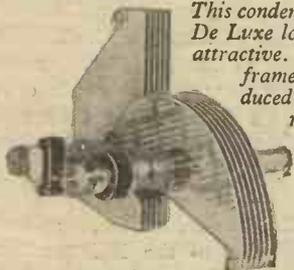


Below is illustrated the Miscellaneous Trading Co.'s special line of oak wireless cabinets. Made in three sizes. Prices from 27s. 6d.



The Goodman moving-coil loud-speaker can be built up at home from the kit of parts. The pot can be obtained wound for mains or accumulator.

This condenser (left), the Formo De Luxe log mid line, is very attractive. It is compact; framework has been reduced to minimum, but rigidity is retained. Price only 6s.



Above is a Westinghouse Brake and Saxby Signal Co.'s no-trouble metal rectifier unit—one of the events of 1928. Units for H.T., L.T., G.B.

At 1s. 6d. the Whiteley Boneham anti-microphonic valve holder seen on the right is excellent value. It is quite effective in preventing valve "popping." It is 1s. 3d. if terminals are not required.



On left, Mr. Reyner's famous "Q" coil, which abolishes coil changing, both for aerial tuning and H.F. inter-valve couplings. The prices of the Wearite coils run as follows: Aerial, 15s.; H.F. transformer, 21s.; Reinartz, 21s.

On the left the Wearite filter unit is illustrated. For 9s. 6d., the price of it, that annoying "popping," that spoils the pleasure of listening, can be prevented.



Here is a really fine instrument (on left)—the Ferranti three-scale meter—a better judge of quality than your ears and caretaker of your batteries. Several models. Ask for details.

The Mullard Permacore transformer (on right) is, because of its new core and new windings, remarkably small—remarkably good too. Price 25s.



The unit illustrated on the right would make a very good gift. It is the Dubilier filter unit, which is priced at 28s. 6d.



Among the many Lissen components suitable for Christmas gifts, and eminently so, is the Super transformer seen above. It is priced at 19s.; there is also the inexpensive 8s. 6d. model.

The R.I. and Varley R.C.C. unit, which is illustrated below, also contains an anti-mobo unit to obviate any chance for low-frequency "popping." Very attractively produced, it is marketed at 25s.

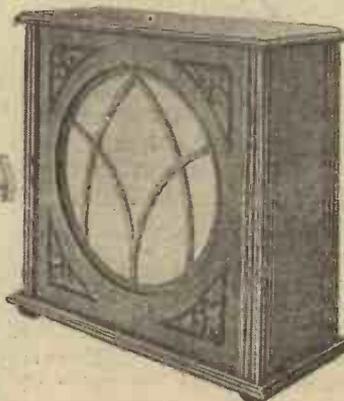


Below is seen the Met-Vick H.F. choke, a very-easily mounted unit, taking little space in a set. Inductance, 55,000 microhenries; self-capacity, 5.5 micro-microfarad. Price 6s. 6d.

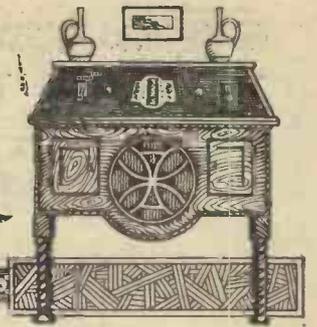


Atlas coils, such as the centre-tapped type shown above, are well and strongly made and can be recommended with confidence.

The new Amplion speaker, the Lion, is illustrated on the right. It is a cone speaker and embodies a certain improvement in the unit, giving greatly improved volume and tone. A handsome present, indeed, in the mahogany cabinet as shown and priced at 210s. Chassis only, 120s.



WITHOUT FEAR OR FAVOUR



A Weekly Programme Criticism by Sydney A. Moseley

POLITICS is a great game. Yet what game are they trying to play with listeners? For the first time since creation we have an opportunity of regularly hearing all sides of the question—and yet one party insists on having two “go’s” at the microphone to the other’s one! This is a great idea of equality, is it not? If the Government—whichever party happens to be in power—thinks it should have two talks, in order to reply separately to the two parties in opposition, then surely each of these parties might make a similar claim based on the same sort of excuse? The average listener, unless he be a political crank, will know what to think of this attempt to suppress these efforts to give us truth from all angles.

Beware of talkers and artistes prefaced with a patronising “by kind permission of . . .”! You are always supposed to feel grateful in advance for this concession on the part of some modest theatrical or newspaper proprietor before permitting us humble listeners to share his gilt-edged monopoly. Invariably, however, it turns out to be a squib or some obvious and cheap form of self advertisement. There are innumerable gifted artistes and speakers who are dying for a chance to broadcast—the only kind permission needed being that from the B.B.C. Mr. A. P. Herbert (by kind permission of *Punch*, whose book, etc., etc.) would, no doubt, have sounded funnier without all this preliminary palaver. Get on with the job, say I, and we’ll tell you then whether the permission was kind to us or not.

Our gibes at the child mimics are bearing fruit. Now we’ll have to ask for a bar against songs and other references to announcers. This feeble playing up to Hibberd, Palmer, and the rest does not sound at all well across the mike. Perhaps it was for this reason that Angela Baddeley’s entire turn fell flat.

The women are carrying off honours of late in the talks department. Miss Velona Pilcher is the latest. She spoke on theatres. Her diction is clear and she gave the impression of knowing what she was talking about. Very different from two male speakers, one of whom spoke from the pulpit

and the other in an appeal for funds. By the way, is this women’s innings due to there being a woman in charge of the talks department at Savoy Hill? I can see men crying out shortly for equal rights!

Notice to artistes, producers, authors, and hangers-on: Isn’t there another theme besides Love? I don’t know for sure, but since we appear to be given dollops and more dollops about kissing, hugging, and sex backchat, you would think that life was made up completely of this kind of tripe. It isn’t . . . Give us a little rest from it, for the love of weary Mike.

Schubert—we’ll want a rest, too, from him for a while—depends on the mood. His song cycles, of course, are full of poetry and longing. Somehow, however, the synopsis read before each song sounded syruppy and insipid. Nor did I care much for George Parker. Perhaps it was that I was in a cave-man mood.

Jackie Coogan sure did put it over. It was the right dope. Other Americans have failed by reason of their: “Oh, you are too, too wonderful! I simply luv London!” Those who wrote the Coogan stuff touched the right note. Good!

Barrington Hooper has a sweet, appealing voice, with perhaps just too much tremulo. He and Leonard Gowings know the songs to sing, too. Sullivan’s “Once Again”—well, I had to send out and buy a copy, which is, after all, a good test of a singer’s appeal.



Ella Retford—as our Cartoonist sees her

Jix revealed himself not as son of D.O.R.A., but as a very human fellow—a rare example of a statesman “going up one” after having been judged mainly from the newspapers.

Glad to see that one more hint of mine has borne fruit at Savoy Hill. The foreign news, instead of being read at the end, all in a heap, is now given out in order of importance. I also gather that my old fight against the studio claqué is bearing fruit.

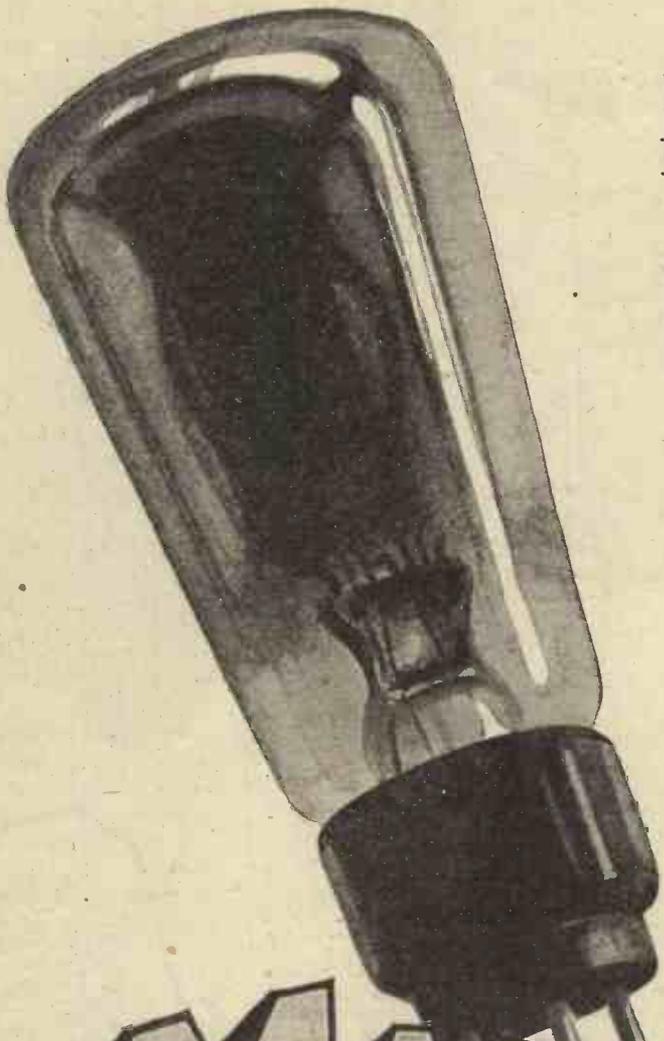
Mr. C. R. Adams, of Hull, spares my blushes to write to the Editor: “As an admirer and regular reader of your valuable journal, I find not the least interesting page that headed ‘Without Fear or Favour,’ by Sydney A. Moseley, in which I have been sorry to notice for some weeks past unfavourable notice regarding the foreign languages talk.”

My correspondent insists that these language talks are “about the most popular and certainly the most beneficial of all talks given by the B.B.C.” Apparently his son, who is attending a secondary school, finds them interesting. Now, here is a case where it is impossible to please everybody. He answers his own case by adding, “all kinds of talks are being broadcast to please the minority of people, who would rather have music, such as Ministry of Agriculture Bulletin, Market Prices for Farmers, Royal Horticultural Society Bulletin, Boys’ Brigade Talk, Girls’ Club Talk, etc., etc.” Mr. Adams thinks that all these should be given before six o’clock, but opposes the earlier broadcast of a foreign language talk! What do you know about that?

“Harold” writes saying that he thinks the B.B.C. are overdoing the piano performances, pointing out that from November 4 to 10 there have been twenty-eight piano interludes or recitals. “No blame,” he writes generously, “must be attached to the artistes, who are, without doubt, some of the finest we have, but I do think a little more variety should be given us when something is needed to fill up a gap.”

I don’t agree!

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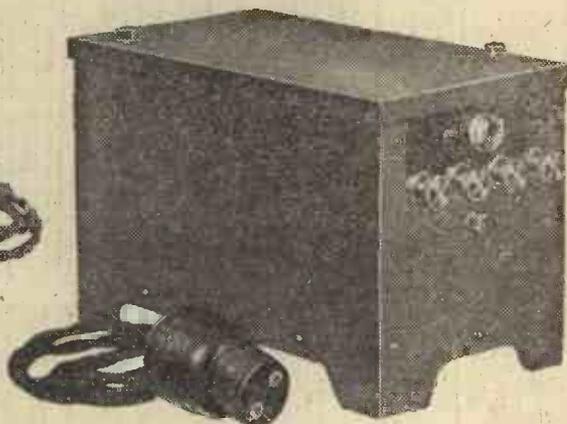
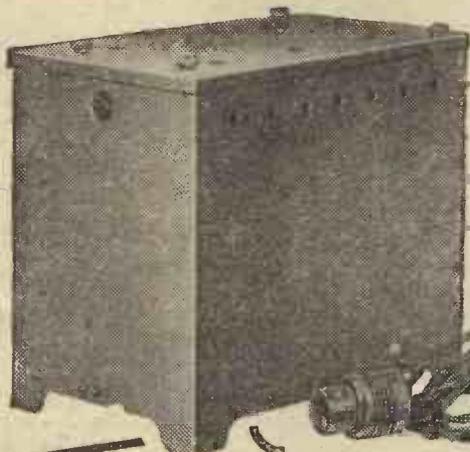
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Scatterby's Problem

A Short Story With a Wireless Interest



By E. BLAKE

JOHN SCATTERBY was wealthy, healthy, and passing wise. Yet, though the City knew him as "Lucky Scatterby" he deemed himself unlucky. Perhaps he knew best, but if, in a moment of abandon, he plunged

brooms, pails, and inelegant button boots.

Miss Viola Prideaux was a photograph. He had seen her in a Bond Street shop, price eighteenpence, complete with silver frame, price five guineas, and had bought both. A pretty face! Character! Unusual nose! Yes, but it "got him," somehow, between midriff and chin. These things are not explained, but experienced only.

The silver frame now encompassed a photograph of Admiral Jellicoe and Miss Prideaux was shifted into a golden setting, and hung over his dressing-table. He had little hopes of her, he confessed to himself. He felt that she had a Family in Putney, including a brother who sold cars on commission, and a Papa who had mysterious business in the City; a business which paid dividends with cheques dated the Millennium. Still, she got him, somehow, and there she was, nose, character, and all.

The Girl over the Way was real. She

Let "Auntie Ida" = x.
Let Miss Prideaux = y.
And, let the Girl over the Way = z.
Then $x = y$, $y = z$, and $z = x$.
In other words,

$$=X=$$

$$Y = Z$$

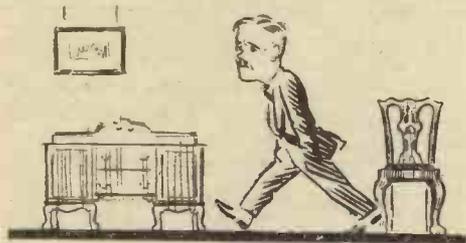
Obviously a case for polygamy or spinning a coin. What a problem! What a world! Never The Voice, The Face, and The Figure all together.

"We have got to eliminate," quo' Scatterby in the privacy of his Yewly retreat. "Let us consider what essentials should remain." The finding was that the Voice, the Face and the Figure were the essentials. Then Fate took part.

First, "Auntie Ida" disappeared. No word from the B.B.C. as to why and wherefore. This flung Scatterby back upon Miss Prideaux and the Girl over the Way; especially the latter.

Next, Miss Prideaux's photograph developed spotted fever or iron mould and had to be buried in a drawer, nose, character, and all. This was a terrific blow. The combination was breaking up and Scatterby felt very lonely, especially as about that time he realised that the Girl over the Way had not appeared in her garden for a whole week; seven days—seventy years. Also, he realised that he could not fix the image of her in his mind. Her face he had never seen properly, what with the distance and absurd garden hats.

"Eliminated, by thunder!" he said to himself. "Scatterby's luck!" Then he broke up the gramophone records, took a large glass of whisky and water, lit an unwholesome pipe and sat down in the rapt spirit of a crusader to do a little job he had saved up for the proper time—an impartial scrutiny of the assets, operations and results of Kansas Quicksilver Wells, Limited, and its subsidiary the Oklahoma



... he walked his Yewly retreat

to the tune of several thousands into some lying stock, the market promptly appreciated and he would clear out with the loot as easily as falling off a log. "Follow Scatterby," was a City maxim.

Yet he walked his Yewly retreat and bemoaned his ill-luck. He was in love with three women. At one and the same time. Not a pin to choose between them.

Item: "Auntie Ida," of 5XP (Greater London).

Item: Miss Viola Prideaux, the professional pianist.

Item: The Girl over the Way.

A pretty mixed bag!

"Auntie Ida," represented the Voice of All Angels. Her voice seemed to him like melted diamonds dropping through mingled dew and honey. It was the voice of Woman; not individual, but Woman as sung by the poets.

He used to leave 'Change early and shoot home to the Yewly retreat so that he might hear "Auntie Ida" talk to the children. His radio set was specially designed by Fogson. You all know what that means. IT.

His craze led him to make gramophone records of "Auntie Ida's" footling remarks to the children and when he was quite private he used to sit and bathe his soul in The Voice. But the scratching of the needle blurred the beauty and he regarded it as a slur on the idolised vocal chords. He tried to get an introduction to the lady, but found her shy of admirers.

He overlooked the fact that reporters do not go forth to propose marriage, but to acquire material for columns which "subs" cut down to inches. However, he sent her anonymously a box of chocolates at Christmas—which, I happen to know, she forgot, and was well and truly appreciated by several experienced ladies with



... gazing meanwhile at Miss Prideaux

lived in one of those edifices which represent the highwater mark of the modern builder's inspiration. One garage (or room for) and one noble, pillared porch; the rest mere vulgar plaster and wood (unseasoned). John Scatterby knew nothing of the poetry of motion, but that was what attracted him when she walked in her garden. A delicate, swinging gait! Gods above! Ye who fashion the waddlers and striders what did ye to man when ye fashioned this lithe and limber form and mechanism? You cooked Scatterby's goose!

The day he saw her trying to feed a lamb from a bottle he rushed into his house and in agony of mind set his gramophone to its work on the records of "Auntie Ida," gazing meanwhile at Miss Prideaux. What a problem!

He stated The Case on his blotting-pad on March 15, at 11.19 A.M., while Sir O. Cribber tried to "interest" him in Consolidated Radium (1927) Incorporated, as follows:



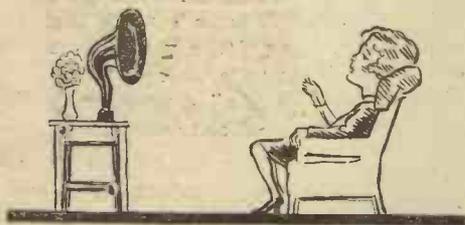
... an arm round the waist of that slender lily

Tungsten Mining Corporation. Within the month Mr. Yakob Stein, who invented the name of those two swindles, was stoking the *Olympia* on her outward run, under the name of Rafael Bloom.

"SCATTERBY'S PROBLEM"—A WIRELESS STORY (Continued from preceding page)

But vanished was Scatterby's joy in the power which was his. He felt like a boy caught killing a spider, and even a trifle sorry for Yakob. After all, the little beast was merely pitting his wits—such as they were—against the gullibility of the get-rich-quick crowd who were not strong enough to combine patience with four per cents.

Oh, for an arm round the waist of that slender swaying lily, the Girl over the Way! Employ a detective? Bah! he could imagine the fellow's reports. "*Pursuant to your instructions, I duly located the person named and beg to report. . .*" Sordid and melodramatic! Hopeless! Get the wireless people to broadcast an appeal!



—had a set installed at Miss Prynor's

Hopeless! Moveover, they—er—she—wouldn't respond; he had neither rhyme nor reason to proffer.

So Scatterby continued to pile up money and to nurse a queer empty kind of ache underneath his top left-hand vest-pocket.

Laleham was the partially-disabled ex-soldier who looked after Scatterby and Yewly Lodge for a wage too big for the job, by ordinary standards, but only right for the man who had crawled into a barrage to bring in the dying Lieutenant William Scatterby, John's young brother. He was a "noticing sort of blighter," as Scatterby had remarked on several occasions.

Laleham was sore troubled. He knew why the Girl over the Way had been absent from her garden so long; knew where she was; knew her name. All of it knowledge which rightly belonged to Scatterby. But Laleham knew the Yewly doctor's chauffeur too. A sad case it was, the latter had said. "Kind of job the guv don't like, mate. No simtums, much. Nothing you could put your 'and on and say, 'This here is the rheumatics or hairysippilars.' Says it's a speeches of general fungshional debility. No 'eart for nothing. Nice young gal, too."

Therefore Laleham muttered as he cleaned the spoons and swore he was in a first-rate fix. To tell or not to tell. Queer! when a man's duty seemed to pull both ways at once. Laleham began to eliminate too, and, like all brave souls, he saw more virtue in the harder task. He told.

Scatterby could act, on occasion, like a bolt from heaven. He called the doctor and got the facts.

"That's all I can tell you," said the Doctor. "You are very good to trouble about a stranger."

"Fool," said Scatterby to himself.

"But," continued the doctor, "I have known cases like this completely cured by the constant influence of some deep interest, or—something which kept the patient looking ahead. From day to day, you know. In this instance . . ." he pursed up his mouth and shrugged as he reached for his gloves. . . . "I'm afraid . . ." He left his fears unexpressed by words but seared on Scatterby's brain.

"Do me the favour, Wilson," said Scatterby, "to say nothing, know nothing, of my inquiry or of anything that—may happen. I am going to be—to try to be—the hand of Providence."

Scatterby could act like lightning. He bought the doctor's chauffeur, the chauffeur's sweetheart, who was housemaid at the house of the Girl over the Way, and he appointed Laleham as Chief Villain and Postmaster-General. He learned that She was Miss Prynor. That She had no radio set. Almost on the instant he formed the "Incorporated Invalid Alleviation Trust"—on a half sheet of notepaper—and on its behalf had a set installed at Miss Prynor's. Once a week Laleham's brother inspected it, asked shrewd questions, thanked the lady in the name of the Trust, and reported to Scatterby.

Every morning brought flowers to Miss Prynor; deceptive flowers, which could not possibly be real or in season. As a matter of fact they were grown in special forcing-frames under the influence of artificial ultra-violet light and cost more than fine porcelain. They were accompanied by a series of cards bearing puzzling mottoes. There was a "scene" when Miss Prynor ordered the housemaid to denounce the sender and was met with a bit of superb acting. Louise knew nothing. How should she know. Was it *her* business to know? Hoity toity—and much more.

Gradually the Girl over the Way fell into step with the business and began to look forward to the morning announcements—"said with flowers." Nothing whatever could she extract from Scatterby's loyal minions; they were dumb.

The doctor watched the process as one who sees magic done and began to have doubts about the British Pharmacopœia; the girl mended daily and showed signs of argumentativeness. Splendid! Then she wanted to go into the garden, a proposal which was quashed in heavy "bedside manner." So then she got up and went

out—which was precisely what the doctor wanted. If she had thrown a vase at him he would have been the happiest M.R.C.S. that ever "listened-in" to a lung.

Laleham, released from his strange duties of the past few months, got a day off. He was nearly plimsoll under with the fruits of his labours, thanks to working for Scatterby, and saw need for a little relaxation at some place called—Southend-on-Sea, I believe. So his boss was left alone to witness Miss Prynor's outbreak.

Scatterby got a step-ladder, one of the most dangerous contrivances ever made, and placed it against a tree from which he purposed to chuckle foolishly as the Girl over the Way undulated over her lawn. His Girl, saved by him, he said—to the step-ladder.

As he plunged about the garden with the ladder, the Girl was putting on that ridiculous garden-hat in front of a window from which she could see his demesne. She saw him plant the ladder and ascend wobblingly to the top. Then the ladder collapsed and he fell, and lay very still.

A broken ankle causes one of the sharpest displays of pain to which the human senses can respond. Hence Scatterby's faint can be excused. When he emerged from unconsciousness into a universe all ankle and



Then the ladder collapsed and he fell

shooting stars he groaned deeply; he would miss the show after all.

But he rubbed his eyes and cursed under his breath a moment later, because he was "seeing things."

Item: "Auntie Ida," of 5XP.

Item: Miss Viola Prideaux.

Item: The Girl over the Way.

He murmured this list and groaned again. Then the composite vision bent over him, very tenderly, and whispered, "I am all three, and you are the Unknown Benefactor. There—put your head—so."

"By James! How did you know?"

"Laleham gave you away. That is why he thought he had better have a day off," said All Three.

"Did you jump that wall?" he asked.

"Like a bird."

"I am 'Lucky Scatterby,' then."

MR. J. L. BAIRD

Talks of his Progress in Television

I HAVE always maintained (said Mr. John L. Baird recently to an AMATEUR WIRELESS Special Correspondent) that there is no essential difference in the difficulty of transmitting moving pictures by wire or by wireless. There are, I know, investigators who are pessimistic, to say the least, about the possibility of successful broadcast television. I have never believed this, and I may safely say that I have proved it to be wrong. It has taken me over five years to bring television in this country to its present state of development—a long time, but no time has been wasted.

Even before I studied at Glasgow University—more years ago than I care to remember—I was experimenting with selenium cells, first with the idea of producing a talking film, and this led to experiments in television; but the only thing I succeeded in doing with those early selenium cells was to burn my fingers!

Early Attempts

Seriously, though, by 1922 I had worked out a scheme for practical television, which would work almost equally well either with wire or wireless link, and in 1923 I was able to give a small private demonstration of shadow television at Hastings.

"What were the difficulties you had to overcome?"

Well, my chief trouble, up to that time, had been to obtain a sufficiently sensitive light cell. I had tried selenium cells of nearly every conceivable form. Selenium-coated soap-stone cells of block formation numbered among the best, but, as is well known, selenium's "time lag" in electric response to light variations places a limit on the use of such cells for television.

I had tried colloidal cells and photoelectric cells of potassium, and also of rubidium in low-pressure argon or helium. Each had merits and demerits for television purposes, but at last I devised a cell which gave reasonable results in a shadow televisor and which made the Hastings demonstration possible.

Reflected Light

The success I obtained with that shadow transmitter and receiver in 1923 showed clearly that television could not rest there. Shadowgraphs had a limited application,

and so I at once started experiments with apparatus that would transmit *reflected* light from an object, and not merely the variations of an intercepted beam of light emanating from behind the object.

This made it necessary immensely to increase the sensitivity of the apparatus; for, obviously, the variations of reflected light from an object are infinitely weaker and less clearly defined than is the case when moving shadowgraphs are being transmitted.

During 1924 and 1925, therefore, I was engaged in steadily overcoming the difficulties connected with operating by reflected light, and chiefly in testing every available form of light cell and devising cells of my own pattern.

The reward—if such I may term it—came in April, 1925, when the apparatus was so far developed as to warrant a demonstration in London at the Selfridge stores. In all, this lasted two weeks.

"Was a human face used for this reflected-light demonstration?"

No; the image used was a board shaped to represent a face. The "nose" and "eyes" were black-painted lines and circles, and by covering the "eyes" with a white card the object could be made to wink at the transmitter! This gave a fairly clearly defined reflecting surface for the light-sensitive cell, and the received image, although crude, was easily distinguishable

Synchronism

There is one feature of television transmission which I have not yet touched upon, and that is the essential synchronism between transmitter and receiver. For the Selfridge demonstration (already mentioned) of reflected-light transmission the viewing disc was kept in step with the scanning disc by means of a transmitted note of about 300 cycles per second. This was received, amplified by means of a Mark IV amplifier using LS5 valves, and fed to a relay of the P.O. type. The relay output was taken to a small alternator on the shaft of the viewing disc, and in this way synchronism was maintained.

A separate channel of communication was necessary, and still is with other systems of television. This offers several objections, particularly when a radio link is used, for it doubles the frequency band covered by the transmission. In the case



of wire transmission this means an extra cable. These are serious practical objections, and since 1925, when reflected-light television was proved to be possible, I have devoted considerable time to synchronism *without* a separate communication channel.

"This, I understand, you have accomplished successfully?"

Yes, this is now possible, and I have embodied my new system in the latest televisor receivers. On the front of the televisor is a synchronising control, which is rotated until the picture is steady.

Recent Developments

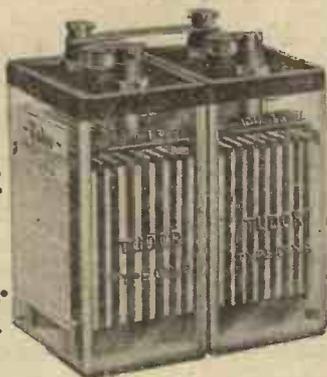
The two most recent developments are daylight and colour television. Daylight transmission is rather important, because it means that television apparatus can be used for the wireless transmission of outdoor events without the need for special lighting; this has been made possible mainly by cell and amplifier improvements. Colour transmission is yet in its infancy, but present results are such that, with a human head before the transmitting lens, the whites of the eyes and teeth, and the prominent colouring of such things as flowers or fruits stands out in a striking fashion.

Television in the future must, of course, go hand in hand with wireless, for wired television has a certain limit placed on its scope of application. Now, in 1928, it is possible both to see and hear a speaker in front of a television transmitter.

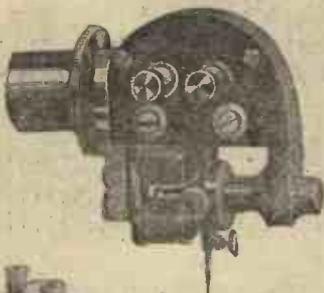
"Yes, Mr. Baird, that is, in brief, what you have accomplished after five years of hard work. Now what can you prophesy for the next five years?"

But Mr. Baird, who is, above all, the cautious Scotsman, merely shook his head and smiled!

MAKE IT A WIRELESS GIFT! (Continued from page 957)



Left is a 4-volt L.T. accumulator representative of the excellent range made by the Tudor Accumulator Co., Ltd. They are substantially made and "live long."



On left the Celestion, Woodroffe-type pick-up is illustrated. A first-class instrument suitable for all gramophones (special attachment for H.M.V.). Price 84s.



Hellesen batteries have a worldwide reputation—and they deserve it. Above a 60-volt unit is shown (price 10s. 6d.), but others from 15 to 108 volts are available. The 108-volt unit is 20s. only.

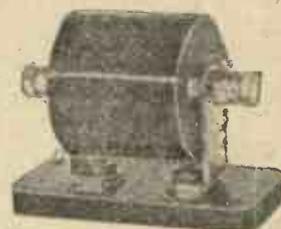
The British General L.F. transformer (on right) is a very handsome instrument in bright nickel case. Very good reproduction. Available in 5-1 and 3-1 ratios, both priced at 18s. 6d.



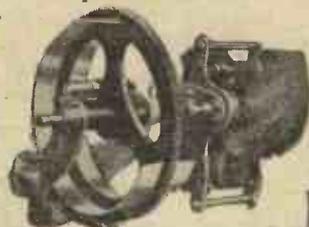
The General Electrical Co.'s rheostat (right) is available in 6-, 12- and 30-ohm values at 2s. 9d.



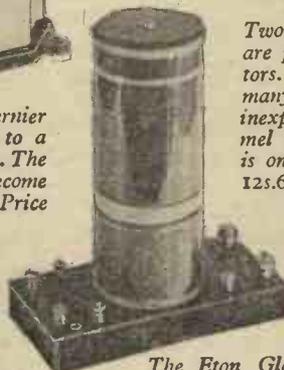
Two-waveband tuner units are popular with constructors. Their advantages are many, not the least being inexpensiveness. The Wamel tuner seen on the left is only 12s. 6d.



The Bowyer-Lowe high-frequency choke operates over the whole range of wavelengths from 7½ to 4,000 metres. It is a very neat component and is priced at 7s.



Right is the Igranic vernier drum control coupled to a "Lokvane" condenser. The drum control has become very popular lately. Price 17s. 6d.



The Eton Glass Battery Co. markets a special L.T. supply unit seen on the left.

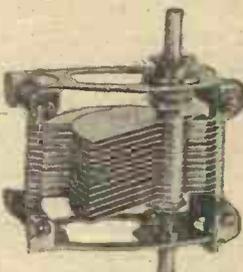


Below is the Ever Ready super-capacity type, 45-volt H.T. battery—guaranteed to solve your H.T. troubles during a long life! Length, 8½ in.; width, 4½ in.; height, 8 in. Price 21s.



The Bowyer-Lowe six-pin coil base illustrated below is a very well designed, attractively produced, and inexpensive component. Can be recommended.

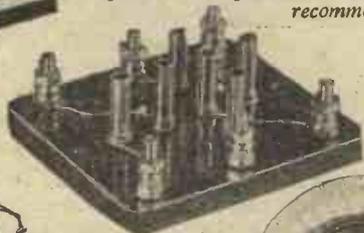
The R.I. & Varley components that would make excellent Xmas presents are many. Above is the four-terminal straight-line transformer: good value at 25s.



If the question is selectivity, a wave-trap of some kind is the obvious solution. On the left the Harlie wave selector, which is 12s. 6d.

The Lissen variable condenser is an excellent example of how a good component can be inexpensively produced. Prices 5s. 9d. to 6s. 6d.

MORE GIFTS ON PAGES 956-957



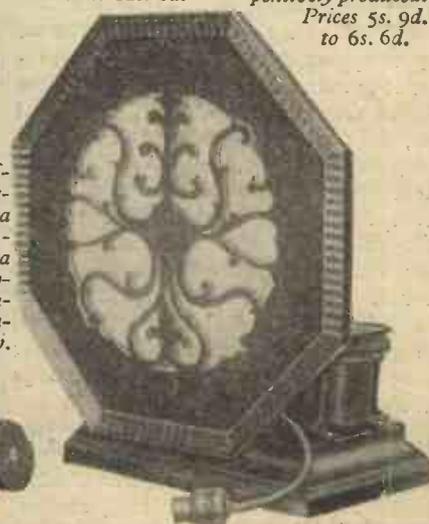
Very neat is the Lotus (Garnett-Whiteley) slow-motion dial.

Unique in design, but a very good proposition. It is priced at 4s. 9d.

The M.P.A. self-energising moving-coil loud-speaker is a very excellent instrument, making a handsome gift. Moving-coil loud-speakers, of course, are unrivalled for quality.

Here, above, we have the Mullard P.M. H.T. unit—a H.T. current supply solver. Write to the makers, giving details of your mains supply.

The loud-speaker unit (for cone-speakers) seen on the right is that made by Goodmans. It is priced at only 27s. 6d.—excellent value indeed.



MY WIRELESS

DEN *By* W. JAMES



Weekly Tips for the Amateur

I FIND there is often some confusion in the minds of amateurs regarding the effect of different high-tension voltages and grid-bias values on the anode impedance and amplification factor of a valve.

The valve manufacturers usually quote average figures—that is, when the high-tension is 100 and the grid bias zero. Under ordinary amplifying conditions, a negative grid bias is almost invariably employed. What is the effect of this negative bias?

The chief effect is that the impedance of the valve is raised, resulting, of course, in a reduction in the anode current. The amplification factor of the valve may be altered a little, but usually not to any considerable degree. When the H.T. voltage is raised the opposite results. The impedance of the valve is reduced and the anode current increases.

Under working conditions the impedance of a valve may be as much as 50 per cent. different from that given on the maker's instruction slip! It is well to bear this fact in mind! In the particular instance where the grid is given a large negative bias for anode-bend rectification the anode impedance may be four or five times that of the normal value.

Valves and Howls

As components and valves are constantly improved, it becomes increasingly necessary for more care to be taken in order to obtain satisfactory working.

In the particular case that I have in mind it was found that by employing a new power valve in the output position a high-pitched whistle resulted. The new power valve had a magnification factor of 8 and an impedance of 4,000 ohms, as compared with the 4 and 4,000 ohms of the original valve.

The coupling to the power valve was an inter-valve transformer of modern construction, and its manufacturers made a point of the manner in which it magnified the higher audio frequencies.

Here was a combination which was particularly liable to generate a high-pitched whistle. The inter-valve transformer itself had a fairly high natural frequency, and the amount of coupling through the valve was sufficient to set it oscillating.

A temporary cure was effected by connecting a damping resistance of .5 or 1 megohm across the secondary winding of the transformer, but since it is always

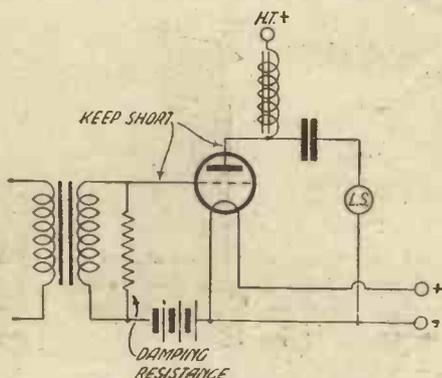


Fig. 1. To prevent a howl

better to endeavour to prevent the oscillations, efforts in this direction were made by rearranging the circuit. (See Fig. 1).

The grid lead from the transformer was made as short as possible and the anode wire from the valve spaced from the grid

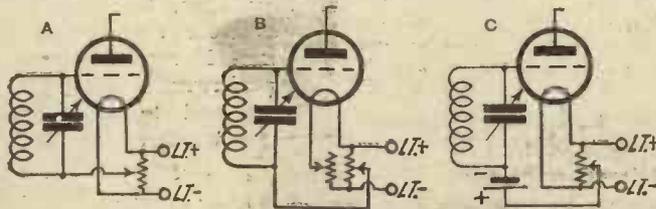


Fig. 2. Three ways of obtaining fine G.B. adjustments

wire so as to minimise the inter-capacity.

A valve has a certain grid-to-anode capacity, and this is effectively increased under working conditions by an amount which approximates to the magnification factor of the valve. It is not hard to understand why the whistle was caused; when the new valve was employed the effective capacity was greatly increased, and this was combined with the greater difference between the anode and grid voltages.

Using a Potentiometer

Where a fine adjustment of grid potential is necessary, a potentiometer can be used. There are several methods of connection, three of which are indicated in Fig. 2.

In A the potentiometer is connected across the filament heating accumulator. The potential of the grid may therefore be varied from positive to negative; when the sliding contact is on the positive side, it is at the same voltage as the filament; ditto when the contact is on the negative side.

With the arrangement shown in B, the contact may be given a potential which is more negative than the end of the filament of the valve, because there is a fall in voltage across the filament resistance. In C a dry cell is shown connected in the grid circuit, the result being that, while the grid potential may be varied by the amount of the voltage of the filament battery, the maximum negative potential is 1.5 volts. When a small negative potential is required the scheme of figure B can be used, but it is generally better to employ scheme C when a negative bias in excess of about 1 volt is needed. The arrangement of A is suitable when a leaky-grid detector is employed and a potentiometer is provided to obtain smooth reaction or the greatest sensitivity.

H.T. Accumulators

A little kindness does it; in the case of the accumulator-type of H.T. battery, anyhow. But without kind and constant attention this type of battery soon refuses to do anything. You cannot stow it away out of sight and forget it. Well, you can, but . . .

These batteries must be fairly frequently charged and the acid level regularly made up with distilled water. This done, the accumulator H.T. battery is excellent.

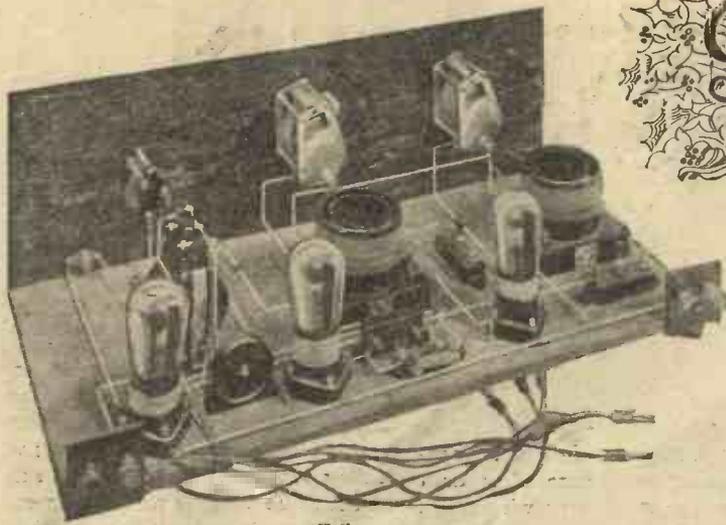
For the filling business I always use a fountain-pen filler. Sometimes, when the hole in the top of the cell is too small to allow the air to escape as the liquid takes its place, this becomes quite an unattractive job. All that need be done is to provide an escape hole for the air. As the cells are usually pitch-covered, a suitable hole can be made with a pin.

The Northern Area B.B.C. Educational Advisory Council is very much encouraged by the step taken by the Scottish National Committee for the Training of Teachers in deciding to instal sets at the training colleges for experimental purposes.

The ALL-BRITAIN

TEN STATIONS ANYWHERE :: NO

By J. H. REYNOLDS



IT is a very easy matter for the designer of radio apparatus to get into a groove. If the sets which he designs show up well on a test in his own locality, he is apt to feel that all is well and that

finally a model of the receiver itself has been tested in no fewer than eight different centres throughout the British Isles.

A receiver which can come through such a test with flying colours is one which no reader need hesitate to make up, at any rate, on the score of performance. But when we add to this the fact that the whole receiver, including wire, screws, etc., can

be made for less than £5, then it will be clear that the design is something unusual.

A glance at the



The Complete "All-Britain Three"

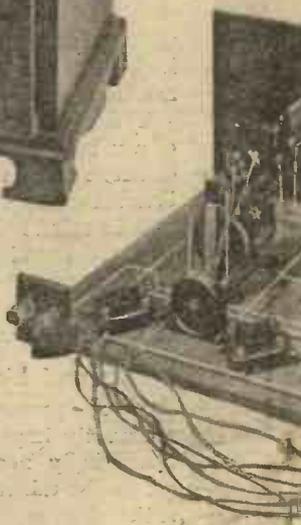


the set can be released with safety. The difficulty is that readers in the more remote parts of the country experience conditions totally different from those under which the designer himself has worked, and they have, therefore, to sift the evidence presented regarding the performance of the set and to decide whether the receiver will deliver the necessary signals in their own particular locality.

The "All-Britain Three" is an attempt to overcome this trouble. It has been designed as a result of information carefully compiled from a tour of the whole country. From the data so collected, the design of the receiver was worked out, and

These two photographs and the one above give an idea of the layout and will help materially in the construction

photographs and diagrams accompanying this article will show at once that simplicity is the keynote of the set. The baseboard carries few components and the connecting wires are few in number. The receiver can, indeed, be constructed with ease in an evening—I actually made up my first skeleton model, starting absolutely from nothing, in an hour and a-half—and there is no reason why the final receiver as shown herewith should not be made up in a similar time.



TESTED AND PROVED EFFICIENT AT EACH

TAIN THREE

NO COIL CHANGING :: UNDER £5 TO BUILD
 ER, B.Sc. (Hons.), A.M.I.E.E.

The circuit of the receiver is shown by the diagram. It will be seen to comprise a high-frequency valve, neutralised on the split-primary principle, a detector and a single transformer-coupled low-frequency amplifier. This circuit was chosen after many trials as being the most suited to the needs of the whole country. The straightforward detector followed by two L.F. stages has held sway for a considerable period, but there is no doubt that the discriminating public is beginning to require something better.

The advantages of the high-frequency stage are many, the most important being the increase in range of the receiver and the increase in the selectivity. Those readers who live some distance from a local station require to be able to obtain loud-speaker

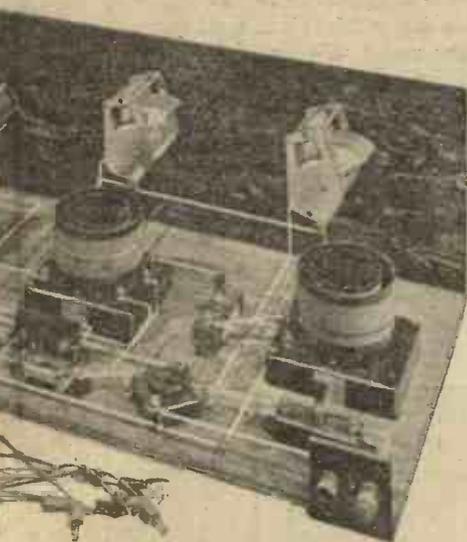
tuned circuit. The layout of the receiver will be seen to be arranged with one central control on the detector valve and two subsidiary controls on each side. The left-hand control is the aerial tuner, which is not critical, and the right-hand control is the reaction dial. In practice it is merely necessary to set the centre dial to the approximate position required, swing the left-hand dial until signals are at a maximum, and then adjust the reaction control, with a final retune on the centre dial, until the station comes up to the required strength. Operation, indeed, is every bit as simple as with the ordinary detector circuit.

Selectivity

Apart from this question of strength, we have the most important factor of selectivity to consider. Particularly in the provincial districts, the majority of readers live fairly close to a local station, and for any satisfactory reception it is necessary that they shall be able to cut this local station out fairly rapidly. This is achieved in the present receiver by virtue of the fact that there are two tuned circuits. It is a matter of comparative ease to cut out one's local station and receive distant stations without any interference whatever. The test reports

which will be given next week will illustrate this fact adequately.

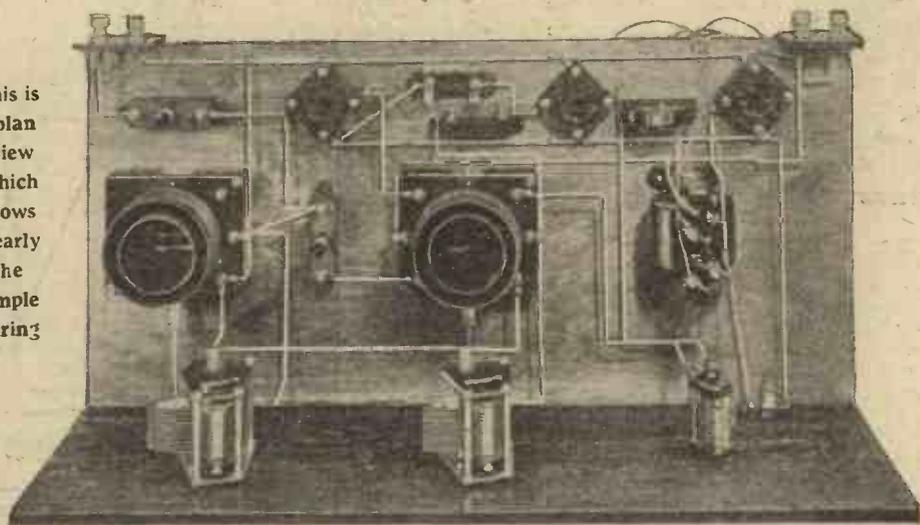
Added to this we have the advantage that, owing to the use of the now popular "Q" coil, we are able to tune to both wavebands without any coil changing. It is quite impossible to obtain a circuit of the type shown in which a tight-coupled and therefore absolutely stable system of neutralisation is employed with any other form of dual-range coil, the particular feature of the "Q" coil being that the same primary, neutralising and reaction windings are in use on both wavebands, the only changing of connections being that of the secondary sections, which are placed in series or parallel to cover the two wavebands required. Owing to the efficiency of this arrangement, which avoids all dead ends, the tuning is sharp and the performance of a high order.



reception without straining their receiver to the limit. The high-frequency amplifier exercises as much amplification as a resistance-coupled low-frequency stage, so that from the point of view of overall amplification we are no worse off than with the popular detector-resistance-transformer combination of a year ago.

On the other hand, we have a greater factor of safety, which means that stations can be tuned in more easily despite the apparent extra complication of a second

This is a plan view which shows clearly the simple wiring



OF THE PLACES SHOWN ON THE MAP



LIGHT and SHADE

YOU can only get the lights and shades of fine music if you have a transformer which leaves the background entirely silent. Again, a single low note missing from a sonorous chord or a single high note distorted in amplification will rob a beautiful composition of much of its effect. That is why musical people who build radio sets almost invariably use LISSEN Transformers; first they want the dead silent background which LISSEN Transformers give, the entire absence of that rustling sound which is almost always present in less carefully designed transformers. Then the critical ear discovers how very even is the amplification, so that every note keeps its true value; a fact which is proved by laboratory curves taken with LISSEN Transformers.

The LISSEN SUPER TRANSFORMER

This Super LISSEN Transformer is made in two ratios, $3\frac{1}{2}$ to 1 and also $2\frac{1}{2}$ to 1. The $3\frac{1}{2}$ to 1 is suitable for use in either the first or the second stage of an L.F. amplifier, or can be used in cascade for both stages, and with practically any valve. The $2\frac{1}{2}$ to 1 transformer is suitable for use after a high impedance rectifier valve without fear of distortion or loss of high notes and overtones. The price is the same for both ratios **19/-**

The famous 8/6 LISSEN Transformer is still supreme in price and will never break down —

The famous 8/6 LISSEN Transformer is suitable for all ordinary purposes, and its huge sale proves it still supreme value. It continues to earn high praise as "the transformer that never breaks down. Turns ratio 3 to 1. **8/6** Resistance ratio 4 to 1.

LISSEN

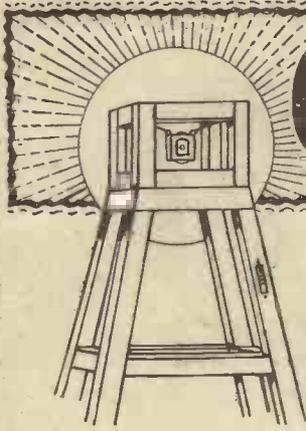
TRANSFORMERS

LISSEN LIMITED, Friars Lane, Richmond, Surrey
(Managing Director: Thos. N. Cole)

To Ensure Speedy Delivery, Mention "A.W." to Advertisers

ONCE AN ANNOUNCER

To the Listener the Announcer is just a Voice. Here are narrated the experiences of one who has filled this role



ALL accounts that I have ever read have almost convinced me that the job of a B.B.C. announcer is one of the world's most charming pastimes. I say "almost," for once I was an announcer. No, I was not relieved of my post, but left of my own volition [*sic*]. Now I sit back and read effusions on the charming pastime of announcing, and am reminded of the speeches of defeated parliamentary candidates who invariably forget the missiles of the election in their thankfulness that all is over.

At last, the truth shall be known. My debut as an announcer was one of the most delightful moments of my life. After all, I was very familiar with studios, artistes (technically speaking), gadgets, and what-nots. I required no help on my first essay—at least, so I thought myself.

Late!

Unfortunately, the night on which I first functioned happened to be unutterably foggy, so that my tram refused to hurry, and no taxi, of course, could be found for love or—an announcer.

Humid within and without from fog, and anxious, I arrived late at the studio door, heralded by dozens of blinking red lights, which meant that the engineer, who was the only other official in the place, was signalling the fact that thousands of people were listening to the carrier-wave only.

This increased my sense of comfort. To add to my *sang froid*, the diminutive waiting-room was packed with a medley of expensive artistes who, between inspections of their wrist watches, looked at me with tired detached expressions.

Those Lights

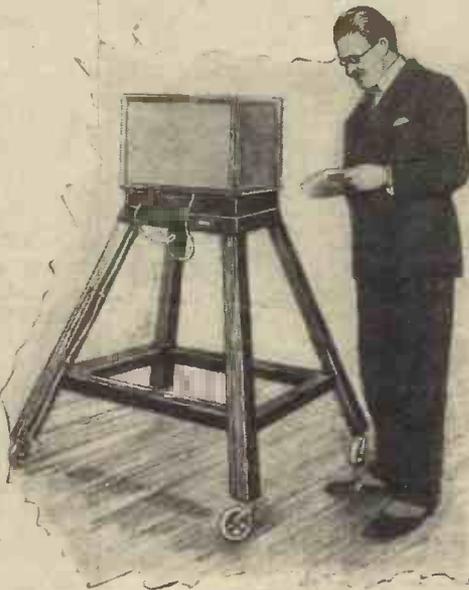
Nevertheless, I greeted them, hurled off my coat and dashed to the control-room, gasped out to the engineer that I had arrived, and quickly closed the door to avoid hearing his reply, as I am—well, not an engineer.

All this time these infernal red lights kept blinking. I turned to the artistes, programme in hand, and murmured: "Pretty lights, aren't they?" I thought that might cheer them up and cast an atmosphere of competency over my department, but there was an entire lack of sympathy.

However, the first martyr followed me into the studio. Then the awful thing happened: I forgot how many times I should push the signal to stop these—er—red lights blinking.

Well, it occurred to me that I had better touch something, so, mincing of step, with absolute daring, I touched everything I thought might be the right button; and with some success, for the red lights stopped their blinking and remained permanently on. So far, so good!

Unfortunately, when I approached the



microphone a distinct pressure of a cramping nature developed in my middle which seriously interfered with my breathing. Completely drying up, I yet hissed sufficiently, and we sailed along. The only real trouble I experienced was a persistent old man on the telephone who inquired the name of the asthmatical foreigner announcing that night.

Now, one has always on these occasions to be polite to the outside public; so I laughed heartily, called him a dear-old frumpy, and wished his rabbits a speedy death. I suppose he is now an oscillator.

I remember also one occasion when a dear old lady rang me up during a symphony programme and asked, rather tear-

fully, if I could give her our official recipe for cooking tripe. She explained, between tearful sniffs, that, unfortunately, her last effort had produced a tough variety and her old man said he was sure that the B.B.C. would know all about tripe. Well, I told the old lady that she was a dear, but that her old man—well—he wasn't.

Many Surprises

One never knows what is in store. I was doing my best to appear cheerful during a programme by a local party of entertainers, when the police insisted on my reading an SOS in connection with a fatal accident. This cheered my band of troubadors immensely. It did seem to fit in with their material, for various 'phone calls asked me why the dear little souls in the studio were not involved in the accident.

How I loved answering these pertinent inquiries as to my froggy throat or Oxford accent; but one foolish man thoroughly amused me. He told me in enraged tones that his wife had just run off with someone else, and would I get her back by means of an SOS, adding that he was quite prepared to go as far as £5, but no farther. I comforted him by saying that as trade was bad he'd probably succeed; yet I had to decline his offer.

Then again I had hosts of charming offers, affectionate and otherwise. I have memories of wonderful letters and messages. I am glad to think that an announcer can break the loneliness of many good souls. "MICROPHILE."

"THE ALL-BRITAIN THREE"

(Continued from page 968)

may be employed. For the last stage a good power or super-power valve should be used. Either 2-, 4-, or 6-volt valves may be employed, the results being unaffected by whichever type is used.

Do not have the Formodenser in the aerial lead screwed right home. If this is done there will be found to be a considerable discrepancy between the positions of the aerial and H.F. tuning condensers.

This set will be on view in the Somerset Street windows of Messrs. Selfridge and Co., Ltd. Somerset Street lies behind Messrs. Selfridges, parallel to Oxford Street. AMATEUR WIRELESS sets are displayed in these windows every week.

THE LETTS' 1929 AMATEUR WIRELESS
NOTEBOOK DIARY

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A FERRANTI TRANSFORMER



TYPE AF4

AT 17/6!

Far and away the best Transformer value at anything like its price.

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A CONE SPEAKER OF EXCEPTIONAL MERIT



PRICE

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Here is the cone loud speaker you have been looking for! Just think— for three pounds you can have a cone speaker of exceptionally good tone, giving sufficient volume for a large room, and having the all-round quality, finish and appearance of an instrument costing two or three times as much.

Ask your dealer to demonstrate this wonderful speaker

B.T.H. CONE SPEAKER

2990

The British Thomson-Houston Co. Ltd.

A Beginner's Detailing Compendium Elementary Facts



AERIAL comes first, for it is the first thing in a receiver. But, being outside, it is liable to be forgotten, and both electrically and mechanically it is liable to "gang aglay." It would pay to overhaul the whole equipment before March winds arrive!

BBATTERY ELIMINATORS for both A.C. and D.C. should be chosen to suit the receiver with which they are to be used. Some eliminators embody chokes and resistances which can deal with an output suitable only for, say, a two-valver. Multi-valve sets and super-power valves necessitate a large amount of anode current, and if the eliminator cannot supply this, distortion and L.F. howling may result.

CHOKES.—High-frequency chokes have to be chosen for the circuit in which they will be used, and the amount of wire, air spacing, and so on determine the wavelength range over which the choke will work properly. Some chokes fail below about 150 metres, but work well up to the extreme wavelength limit, whereas others go down to about 20 metres, but fail above about 1,000 metres.

DETECTOR VALVES operate either on the leaky grid or anode-bend system. The former is more sensitive, but may introduce distortion and damping. Just one point: always choose a detector valve for anode bend having an A.C. resistance of about a quarter of the desired value.

EARTHS.—If a proper earth cannot be obtained, a counterpoise, consisting of a number of insulated wires beneath the aerial and near the ground, often proves efficient.

FUSES should be connected in both H.T. and L.T. circuits for "safety first." Special fuses of the screw-in flash-lamp type can be obtained for H.T. circuits, while the L.T. fuse wire should be connected as close to the accumulator terminals as possible.

GRID BIAS values should be adjusted so that the greatest possible G.B. voltage is applied without causing distortion or loss of signal strength. It is better to have too much than too little; for the greater the G.B. voltage, the longer the H.T. battery's life.

HIGH? Well there are several High's in wireless, and high-frequency is the one you are probably thinking about. The thing to think about these high's is that they can "jump" through space, and H.F. leads need careful spacing in consequence.

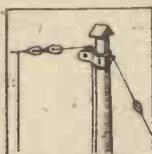
INDOOR AERIALS can give very good results if well insulated, well spaced away from the walls and ceiling, and if there is not too much wire. A common fault is to use a large number of stretches of wire across a room.

JAMMING from the local station, when trying to receive distant stations received at a close-up dial reading, can be cut out in most cases by a wavetrap. Tuners having a centre tap for the aerial, or an aperiodic aerial coil, also improve selectivity.

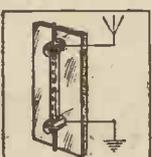
KNIFE SWITCHES are most satisfactory as safety switches for earthing the aerial, and in similar positions where low capacity is essential. Quite considerable capacity can be set up in a switch having large opposed contacts.

LOADING COILS added to a short-wave coil, in order to bring in the higher wavelength bands, need not introduce "dead-end" losses if carefully wound. Where possible, a D.P. C.O. switch should be used to cut the loading coil out of circuit when not required.

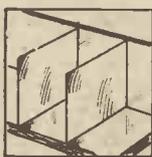
MOTOR-BOATING, a rather common form of L.F. oscillation, can be cured in most sets by an "anti-mobo" stopper. This consists of a resistance of about 30,000 ohms in series with the transformer primary of the anode resistance, and a 2-microfarad condenser connected between this junction point and earth.



NEON LAMPS are useful as indicators in sets deriving H.T. or L.T. from the mains. They take very little current indeed, start to glow when about 160 volts is applied to them, and can be connected permanently across the mains input to show when the "juice" is on.

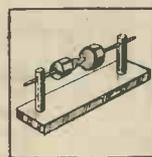


OUTPUT CIRCUITS in the anode circuit of the last valve of the set protect the loud-speaker windings from the D.C. current. The most popular output circuit consists of a choke connected between the power-valve anode and H.T. positive, the loud-speaker being connected in series with a 2-microfarad condenser between the anode and earth.



PICK-UPS with excessive reed damping should be avoided, as they cause excessive record wear, while too little damping results in loss of the low notes. Feeling the needle carrier with the fingers provides no real test of the amount of damping.

"O" COILS enable the long and the short wavebands to be covered merely by the movement of a switch, which puts the two windings of the coil in series or parallel. The contacts are usually self-wiping, and the proper tension of the spring leaves should be maintained.



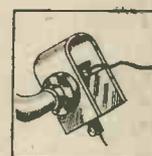
RHEOSTATS are hardly necessary in each filament circuit, one master rheostat being usually all that is required. In some sets, though, a separate rheostat in the detector filament circuit enables this valve to be adjusted to the most critical point.

SCREENING should never be carried out to excess in a set, for if metal screens are placed too close to the coils, condensers, and so on, the natural capacity of the set may be increased.

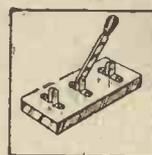


TERMINALS can be "the danger points" of a set, for it is on the terminal panel that battery leads of different potentials are grouped close together. For this reason terminals should be fairly well spaced and there should be no stray wires at the ends of the connecting leads.

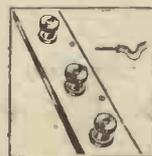
UNDERGROUND AERIALS are commonly used in America, where "static" is bad. Their pick-up efficiency is poor, of course, but they have use for amateurs living close by a broadcasting station and who are troubled by stray A.C. and commutator ripple interference.



VOLTMETERS should always consume as little current as possible for full-scale deflection. Very false readings can be given by cheap meters having little wire on the energising coils and taking quite a considerable amount of current.



WAVELENGTH, wrong connections, wire-wound resistances, Wood's metal, and so on. Quite a gamut of "W's." If "Won't Work" is the most important "W" to you, why not write to "A.W." about it?



"X"-STOPPERS are seldom used in this country, where static interference is not bad, but a small spark gap between the aerial and earth terminal is always a wise precaution. Currents which collect on the aerial owing to lightning or charged rain-drops can discharge across the spark gap without straining the insulation of the set.

YELLOW STAINS on accumulator plates are caused by neglect—usually neglect to charge the accumulator at proper intervals. If not extensive, they can be removed by a process of slow charging and discharging, having first refilled the cell with new acid when the battery is discharged.

ZINCITE. Perhaps you crystal enthusiasts have almost forgotten it nowadays. But time was when zincite, with its partner bormite, was a staple friend in your set,

PREPARE NOW FOR THE CHRISTMAS PROGRAMMES

AND GET A

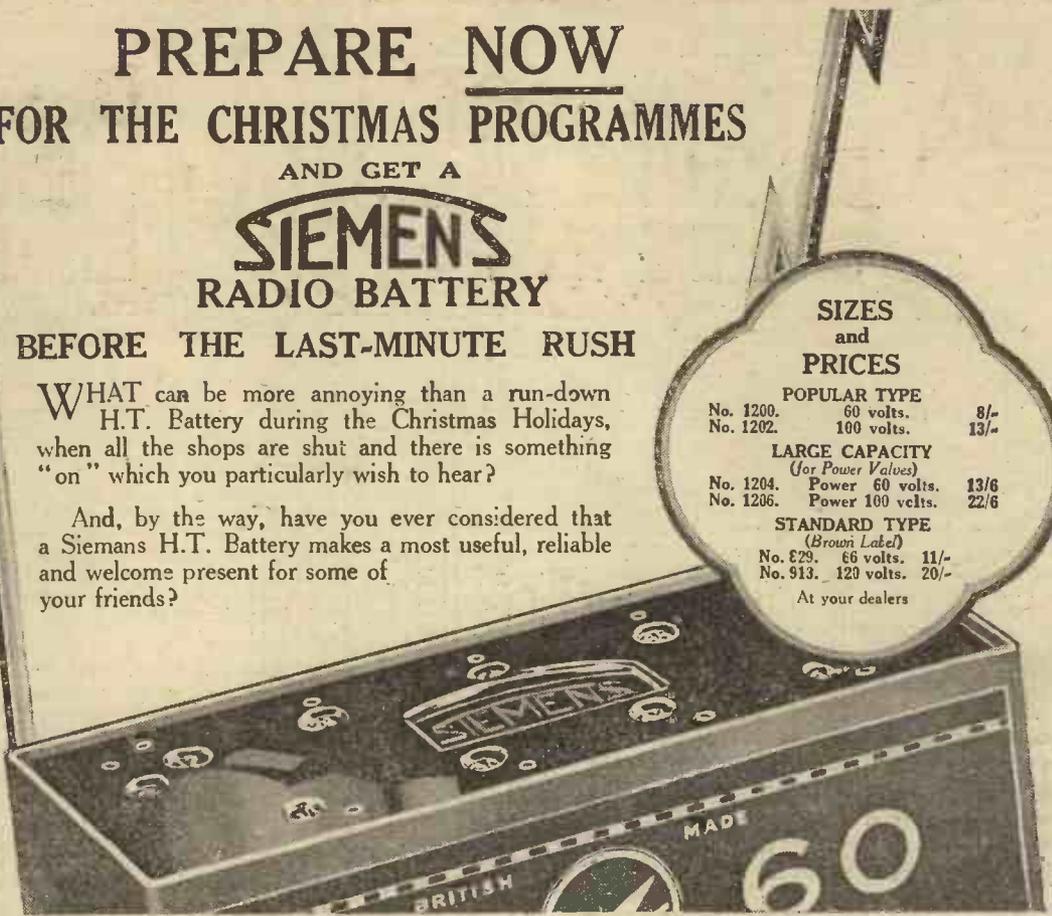
SIEMENS RADIO BATTERY

BEFORE THE LAST-MINUTE RUSH

WHAT can be more annoying than a run-down H.T. Battery during the Christmas Holidays, when all the shops are shut and there is something "on" which you particularly wish to hear?

And, by the way, have you ever considered that a Siemens H.T. Battery makes a most useful, reliable and welcome present for some of your friends?

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No. 1200.	60 volts.	8/-
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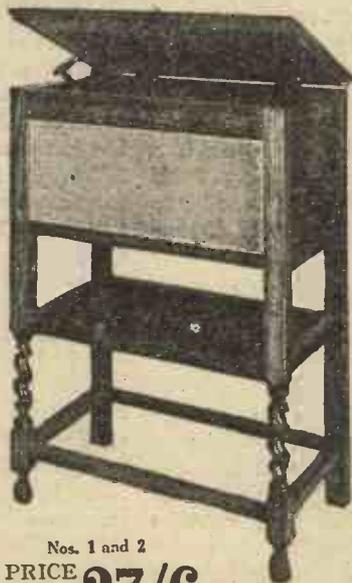
HERE IS THE OAK WIRELESS CABINET YOU ARE LOOKING FOR

Do not put a fine piece of work into a fourth-rate box.

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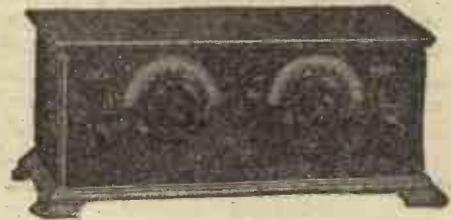
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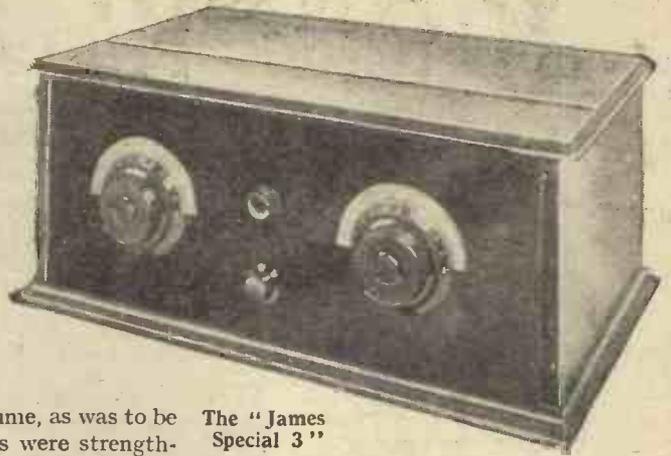
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FURTHER NOTES

ON THE

"JAMES SPECIAL 3"

The Constructional Details of this Receiver were given in our issue dated November 24



The "James Special 3"

IT is important that the designer of a wireless receiver so arranges the circuit that the desired results may be obtained with valves whose combined anode currents do not exceed the amount which may be conveniently taken from the ordinary type of high-tension battery.

This, in practice, means that a limit is imposed upon the size of the output valve, for it is this valve which is employed to actuate the loud-speaker. A certain amount of power is required to drive the diaphragm of a reproducer and this is obtained from the high-tension battery and the last valve. When a small power valve is used the high-tension current is of moderate value, and it therefore follows that powerful signals will not be obtained.

H.T. Limitations

If the high-tension supply is a dry battery the amount of current which may be taken from it is limited if the battery is to have a reasonable life. This is a point which is often overlooked, and many a receiver is blamed as being extravagant when it is the user's fault for not including a suitable output valve.

The total high-tension current of this receiver will be approximately 10 milliamperes when an ordinary output power valve is used, and it may be as much as 15 milliamperes when a super-power valve is fitted in the output stage. These high-tension currents are obtained with a voltage of 120.

A pentode valve could be employed in the output stage when a mains unit or high-tension accumulator is available for supplying it with current. The average pentode seems to pass an anode current of 15 milliamperes at 120 volts and many of them pass as much as 20 milliamperes.

Dry batteries of the usual types will not supply such heavy currents for lengthy periods and, as a general rule, I feel it is better not to recommend a pentode for this reason.

The "James Special 3" gives excellent results when a pentode is employed in the output stage. In my experiments with a pentode, a choking coil was connected in the anode circuit and a two-microfarad condenser in series with the loud-speaker in the usual manner. By direct comparison with an ordinary output valve the pentode

gave much the greater volume, as was to be expected. Distant stations were strengthened, but I think the quality was not quite as good as when an ordinary power valve was employed.

Using a Pentode

This is because the anode impedance of a pentode is much greater than that of a three-electrode power valve, and no doubt a properly designed transformer output is needed. Suitable transformers are not, so far as I am aware, on the market, and all the amateur can do is to employ a choke filter output with a choking coil of at least 20 henries and a 2-microfarad condenser.

Those who care to try a pentode in this receiver will find it an interesting valve, but it must be handled carefully. Owing to its relatively complicated construction, a knock is sufficient to misplace the electrodes and to render the valve inoperative. The valves vary a good deal amongst themselves, some of them taking much more anode current than others. This is only to be expected, however, as the valve manufacturers have not yet so arranged the design that uniform results may be obtained.

When tuning the "James Special 3" it is advisable to make good use of the volume control. Selectivity appears to depend to a considerable extent upon the setting of this control, and by turning it back, in order to reduce the volume, the number of degrees on the dials of the tuning condensers over which a station may be heard is reduced.

Thus, when tuning to a distant station working on a wavelength near that of the local station, the procedure should be, first, to turn back the volume control, and then to tune the desired station at moderate strength. When once it has been heard free of interference from the local station it may be strengthened by means of the volume control and but little interference will probably be experienced.

If an attempt had been made to bring in the station with the volume control full on the local station would have been heard more strongly than the distant one, and it would have appeared that the selectivity of the receiver was not sufficient to separate them. But by tuning distant stations at little strength at first and then increasing the volume, it is possible to receive comparatively weak stations that work on

wavelengths within a few metres of the local one.

The selectivity of the tuned circuits and the amount of the high-frequency amplification may be varied by adjusting the voltage of the shield of the high-frequency valve. As the voltage is increased above the normal value, the tuning becomes broader, because the impedance of the valve is reduced.

The reverse effects are obtained by reducing the screen voltage, and whilst the voltages recommended by the makers should be employed when first trying the receiver it is advisable to make minor adjustments afterwards, as it is quite possible the results may be improved.

Shielded valves vary a little amongst themselves, and those who do not mind a little experimental work will usually find that worth-while improvements may be effected by adjusting the shield voltage.

Some Minor Points

The mistake of allowing the aerial wire to pass round the back of the receiver should not be made, as it is possible that a small coupling between the aerial wire and the tuned anode coils may produce instability. A metal screen is employed to separate the aerial and anode circuits, and there would be no object in using it if the aerial wire were allowed to run underneath the cabinet of the receiver or along the back or top of it so that it passed within a few inches of the anode coils.

A further point which should be noticed is that oscillation may be produced by using a lengthy connecting wire to the anode terminal of the shielded valve. This wire, which passes from the anode circuit through a small hole in the shield, should be cut short in order that only the minimum length is exposed to the aerial circuit.

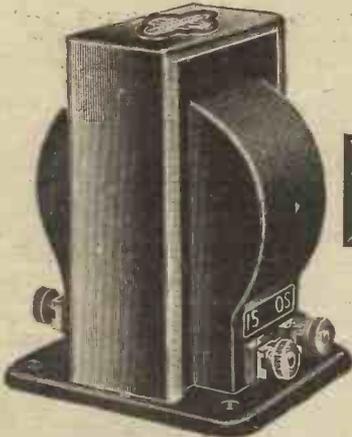
Two aerial terminals are provided in order that two degrees of selectivity may be obtained. The best results will usually be secured when the aerial is joined to terminal A1, as a small fixed condenser is then included in the circuit. But when a small aerial is used, or an indoor one, it is generally better to connect the aerial to terminal A2. A test report of this receiver will be given in our next issue.

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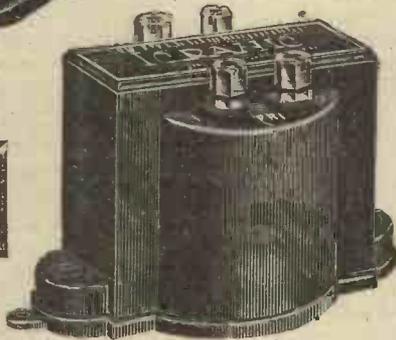
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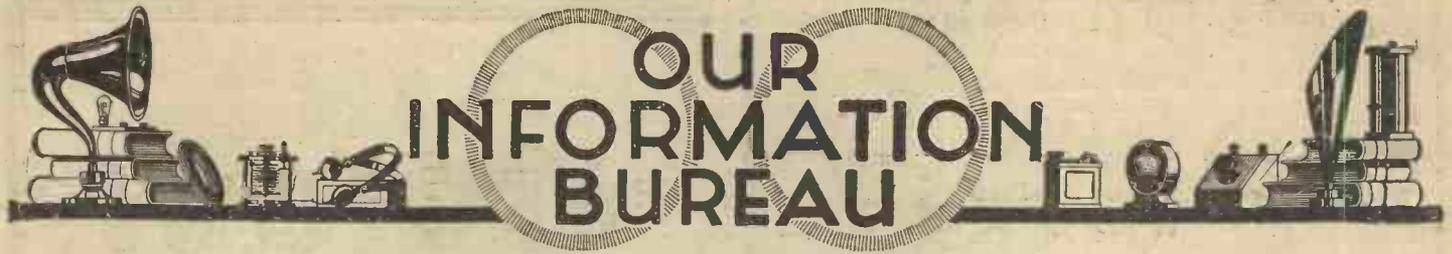
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OUR INFORMATION BUREAU

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Loud-speaker Burnouts.

Q.—I have recently damaged my loud-speaker by either fracturing or burning out the magnet windings. Although the manufacturers were kind enough to repair the damage free of charge, it was rather annoying to be without a loud-speaker for several days and I am now seeking information concerning how such an occurrence can be avoided in the future. Will you advise me?—G. F. (London).

A.—If you will fit a choke-capacity output filter-circuit between your receiver and loud-speaker you will avoid an actual burnout in future. Quite apart from this, the fitting of such a device will most certainly improve the quality of reproduction from your speaker. Without the filter-circuit the whole of the H.T. current through the last valve passes through the windings of the loud-speaker and this, together with the amplified signal impulses, tends to saturate the magnets of the speaker. When a filter-circuit is used, the direct current due to the H.T. battery is by-passed and the loud-speaker windings have only to deal with the amplified signal currents. Consequently the magnets of the speaker have only to deal with a small part of the overall current passing through the final valve and reproduction is materially improved. Complete choke-capacity output filter units can be purchased at a reasonable figure or they can be made up from a 20-henry iron-core choke and a 2- or 4-microfarad condenser. The choke should be connected directly across the loud-speaker terminals of the receiver and the fixed condenser between one side of the choke to one of

the loud-speaker terminals, whilst the other speaker terminal should be connected to the other side of the choke. The polarity of connections to the loud-speaker when using such a device is immaterial.—C. L.

across the grid-filament circuit is reduced and the voltage applied between grid and filament is reduced this tends to flatten tuning instead of increasing selectivity? I should like your views on the subject in case I am on the wrong track.—S. A. (Exeter).

A.—No matter how selective a tuning circuit may be, there is always a certain amount of interference from other stations. If the tuning circuit itself is first made as selective as possible and signals from some station still interfere, then, provided that the required station's signals are stronger than those of the interfering station, one can afford to reduce the strength of the desired station's signals in an effort to eliminate signals from the interfering station. By tapping the grid circuit inductance the voltage variations obtainable from a desired station are certainly reduced, but this also applies to the already weaker voltage variations of the interfering station and we ultimately get much more selective results. It is not detrimental to reduce the voltage of an incoming signal as applied to the grid circuit of a first valve when using screened-grid H.F. amplifying valves as the latter give such enormous amplification that some reduction in initial energy is permissible.—A. L.

When Asking Technical Queries

PLEASE write briefly and to the point

A Fee of One Shilling (postal order or postage stamps) must accompany each question and also a stamped, addressed envelope and the coupon which will be found on the last page. Rough sketches and circuit diagrams can be provided, but it will be necessary to charge a special fee (which will be quoted upon request) for detail layouts and designs.

Tapping the Grid-tuning Circuit.

Q.—I notice that in many present day receivers, especially in sets using screen-grid valves, that the grid-tuning circuit of the first valve is tapped so that the full voltage of the incoming signal is not applied between the grid and filament. The explanation given is that this increases the selectivity of tuning, but surely if the inductance

Long or Short Earth Leads.

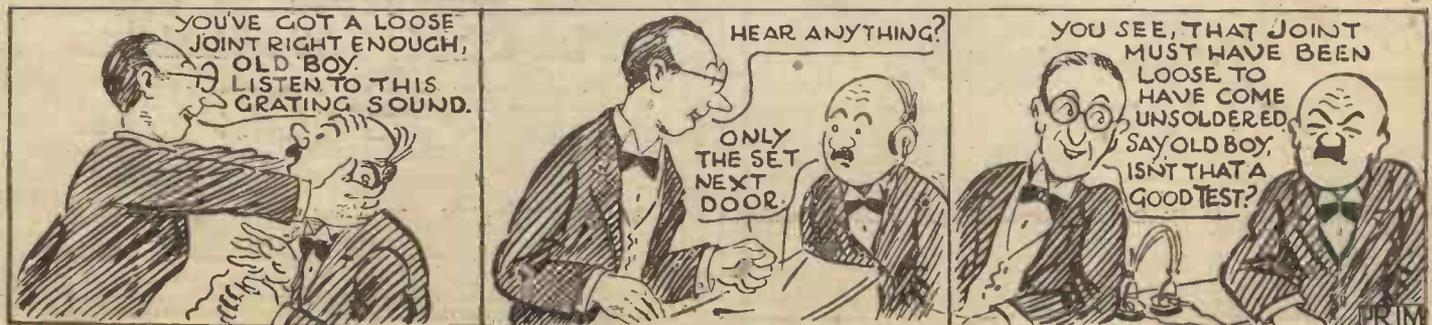
Q.—A short earth lead is always advised but I find that I get best reaction results with a long earth lead. Can you explain this?

A.—A short earth lead is best as long as efficiency is not jeopardised by the nature of the earth itself. The earth is of primary importance.—L. C.

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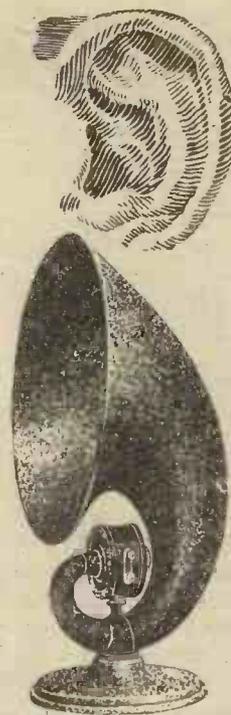
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"A.W." TESTS OF APPARATUS

Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

Tannoy Electrolytic H.T. Unit

VALVE rectifiers for high-tension work are in such general use now that one is liable to overlook the properties of the electrolytic rectifier; this latter instrument does its work efficiently and has certain advantages over the valve type.

We have tested an H.T. mains unit incorporating a full-wave electrolytic rectifier which in conjunction with a suitable step-down transformer, smoothing system and potential divider, forms a complete H.T. mains unit.

Each unit is supplied with a packet of special salts, which can be dissolved in distilled water and poured into the glass cell. After this simple process, the eliminator is ready for work and will give a constant steady output with a background of silence.

The model tested is known as type 16CH and sells at 75s. Tested on a valve set, we obtained an output of 30 milliamps at



Tannoy Electrolytic H.T. Unit

150 volts, which is above that supplied by the average eliminator. One of the most noticeable points about this eliminator was the absence of hum. Another model is also marketed, type 12CH, which is capable of supplying from 30 to 120 volts at a smaller load. During our tests, we actually short-circuited the final output terminals of the unit, obtaining a discharge of approximately 100 milliamps without any harm occurring to the unit!

The makers are the Tulsemere Manufacturing Co., of Tulsemere Road, West Norwood, S.E.27.

British General Transformer

THE British General low-frequency transformer marketed by British General Manufacturing Co., of Brockley Works, Brockley, S.E.4, has been on the market for a considerable period and is well known to readers. The latest model is a massive instrument having good characteristics and capable of efficient performance in low-frequency amplifiers.

The windings and iron core are housed in a nickel-plated container. Four large terminals are mounted on a brown moulded panel on which the necessary lettering is clearly marked.



British General Transformer

The instrument has an imposing appearance.

Tested on the laboratory inductance bridge, the primary was found to have an inductance of 14.5 henries with a polarising current of 3 milliamps, and 11.8

henries with a polarising current of 8 milliamps. These figures are quite high when one takes into account the step-up ratio of 5-1, whilst there is no evidence of serious saturation even with a polarising current of 8 milliamps flowing through the primary.

The component is priced at 18s. 6d. and can be recommended to readers.

Gambrell Voluvernica

FOR adequate control of the volume of sound in a receiver, it is often desirable to use a variable high resistance. This must give a smooth variation over the whole range and should be steady and silent in action.

With the object of providing a reliable resistance for gramophone work and general volume control in a wireless set, Gambrell Bros., of 76 Victoria Street, S.W.1, have introduced their Voluvernica. This is a panel mounting component operated by an



Gambrell Voluvernica

insulated knob which rotates an arm over a resistance element. Due to the design of this element a constant resistance is obtained at all settings, whilst there is no rapid decrease of resistance towards the minimum position, thus ensuring a fine control over volume output.

The component is smooth in action and

on test gave a reliable range varying from 500 ohms up to 2 megohms. This is quite a wide range and the component should appeal to readers.

Aeron Centre-tapped Coil

CENTRE-TAPPED coils are used in a variety of circuits and to facilitate the employment of such circuits with ordinary plug-in coils, special centre-tapped coils are made up by some manufacturers.

An ingenious coil and coil-holder have been submitted for test by Ronald S. Mann, of Dalmeny Road, Bournemouth East. This coil, which is known as the Aeron coil, is of conventional construction as far as the standard plug and sockets are concerned. The socket, however, carries on its side a metal strip while in a corresponding position on the plug is a second metal strip connected to the tapping point



Aeron Centre-tapped Coil

on the coil. The act of plugging the coil in brings the two strips into contact and a good rubbing action is obtained, so giving a self-cleaning contact.

The device is neat and satisfactory in operation. We think it should certainly prove attractive to readers as it obviates any necessity for flexible connections. The contact from the pin, socket, and centre contact strip of the socket are made with soldering tags. We think the component would be improved if terminals were incorporated.

The Minister of Communications at Shanghai has ordered all Chinese ocean-going steamships of 500 tons and over to install radio equipment.

With the aid of the new wireless station at Louisburg, Nova Scotia, fishing fleets daily receive reports on the quantity of frozen bait in storage, quantity of fresh and unfrozen bait available, ice conditions, etc.

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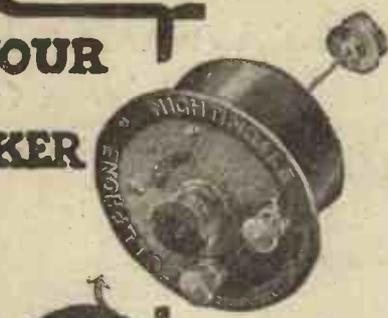
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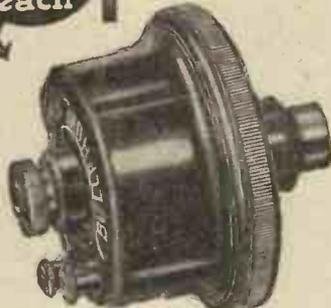
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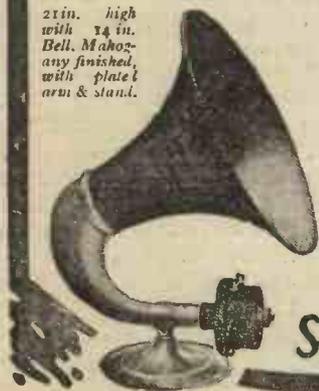
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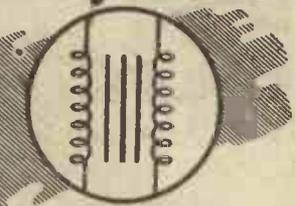
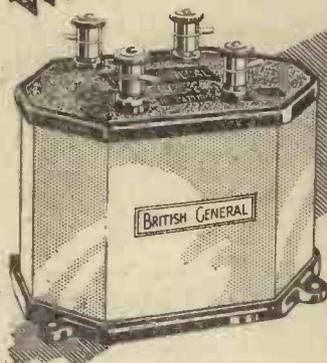
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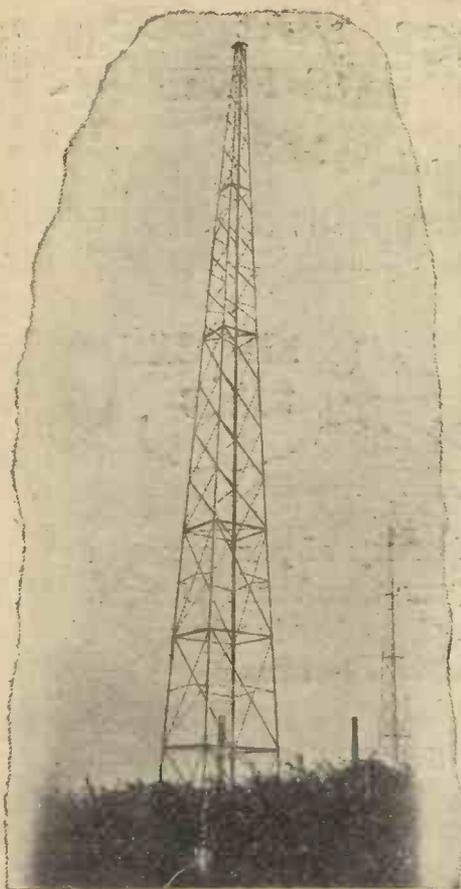
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Christmas Carols from Afar

Stations to Search for at Christmas

By R. W. HALLOWS



ANY reader who possesses a receiving set provided with at least one stage of high-frequency amplification will have a splendid chance this Christmas of making radio play a big part in the festivities of the season. There will be carols, of course, from the local station, as well as from 5GB and 5XX; but why not hear them also sung in other countries which celebrate Christmas as heartily as we do?

A Wide Choice

In France, Spain, Italy, and other Latin lands Christmas is not regarded generally as a season for great rejoicing; the chief winter festivals there are New Year's Eve and New Year's Day. For a real Christmas-massy Christmas we must turn with the wireless set to the Teutonic countries.

Luckily, these countries are well provided with wireless stations of medium and high power, numbers of which are very well received in this country. We have therefore a fine chance of seeing how Christmas is kept in countries such as Holland, Denmark, Norway, Sweden, Germany, and Austria.

The Christmas Programmes

At the time of writing, the Christmas programmes have not been published in detail. The star turns in the programmes of most Continental stations, though, take place between 7 p.m. and 10 p.m., and we shall be sure of hearing carols and other Christmas items if we make a search on Christmas Eve and Christmas Day between these hours. It is likely, too, that

in many cases a late night will be the rule on Christmas Eve; so that searching for foreign stations may continue until the hands of the clock are on their way towards midnight.

If you are planning a Christmas radio evening, avoid two errors that are frequently made. First of all, don't search blindly without having any idea of what you are going for. Secondly, whatever you do, don't treat your friends to a couple of bars from one station, a note or two from the next, half a verse of a carol from a third, and so on.

Making a Selection

As regards the first point—that of going for definite stations—the wise man will spend an hour or two on evenings before Christmas in discovering which of the stations in the countries already named are best heard in his locality. He will find probably that some are weak, others are constantly heterodyned, and others again suffer, more often than not, from the effects of spark jamming or mush. These will be ruled out of the programme and no time will be wasted tuning them in when the great night arrives. On the other hand, he will discover, too, that there are many stations whose signal strength is excellent, whilst it is the exception rather than the rule for their transmissions to be spoiled by one of the various kinds of interference. These he will jot down, together with their wavelengths and—if he is really wise—their condenser settings.

Having selected, say, eight or ten probable stations, the next thing to do is to make out a little time-table as soon as the Christmas programmes are published. From these programmes the very best items should be selected and the stations giving them should be tuned in at the right moment. Unless a selection of the kind is made, one may easily find oneself tuning in one of the strongest and best Continental stations just too late for the star turn.

But the time-table should be rather more elaborate than has been indicated so far. We cannot yet say: "On December 24, at 7.15 p.m., I will turn to (say) Hamburg and be certain of finding him coming in perfectly." Wireless still has its little uncertainties. It may happen that one of the 400-metre group is working rather below his wavelength or that 5XX is rather strong in his fourth harmonic. In self-defence, Hamburg makes a little alteration in his wavelength, only to find that he is getting mixed up with Toulouse. Or, again, there may be spark signals about.

Have, therefore, at least two strings to

your bow; it is sounder policy to have three. Rule off your time-table into three columns, and opposite 7.15 p.m. show not only Hamburg, but also two other well-received stations whose programmes contain suitable items at that time. Then, if your first selection lets you down, there is always the second or third to fall back upon.

The choice of stations will depend considerably upon the locality in which the receiving set is situated. On or near the coast, for example, it is highly unlikely that a station such as Koenigsberg will be chosen, since his wavelength of 303.6 metres is rather too close to the lower commercial wavelength to be quite comfortable. Inland, however, Koenigsberg is often very well received. Southerners will find that the German and Dutch stations are, on the whole, better than the Scandinavians; in the north, Oslo, Stockholm, Motala, Kalundborg, and Copenhagen will appear in the first column of many time-tables; in eastern areas the selection is a very wide one, since so many of the German stations come through with great strength; the farther west the receiving station, the more necessary will it be to make a selection beforehand and to confine oneself to the higher powered stations from the various countries.

German Stations

Now for some of the stations which may find a place on various lists. Let us take the Germans first of all. Here it is most important to remember that there are very few German stations which have not relays on different wavelengths. If, therefore, the parent station is jammed or is badly received for another cause, one of the relays will often come to the rescue. The Berlin programmes are sent out not only from the Voxhaus station on 483.9 metres, but also from Koenigswusterhausen on 1,649 metres, and sometimes on 1,250 metres. Breslau, on 322.2 metres, is relayed by Gleiwitz, on 329.7 metres; here it is interesting to note that though the parent station is rated at 4 kilowatts, the power of its offspring is no less than 6 kilowatts. Gleiwitz, in fact, is often much better received than Breslau.

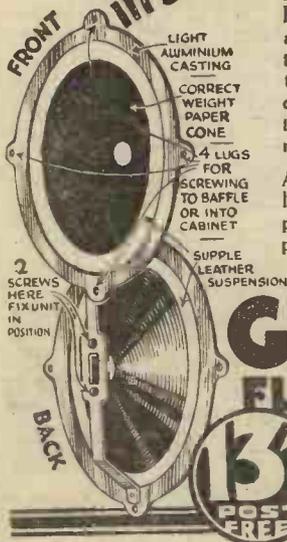
Relays

Similarly in many places in this country it pays to receive the Langenberg programmes from Cologne. The latter station has not the same power rating, but for some queer reason it comes in much more powerfully. Langenberg is relayed also by Munster on 250 metres, which is often

(Continued on page 1002)

BLUE-SPOT USERS!!

Get the Floating Cone that makes a perfect Loud Speaker in 5 minutes-TO-DAY!



Here's the efficient, completely assembled Floating Cone that Blue-Spot Users have always wanted. Simply two screws and the unit is in place—and the whole ready to screw on to a baffle board or into a cabinet, making a first-class loud-speaker that will reproduce with fascinating realism at infinitesimal cost!

A sound job, too—perfectly assembled—light aluminium casting, correct weight paper cone, supple leather suspension, post paid and ready for fixing at once.

GILMAN'S FLOATING CONE

Send P.O. for 13/- to-day to Manufacturers, J. S. Gilman, Portland House, 79, Basinghall St., E.C.2. Orders in strict rotation. "Blue-Spot" unit (adjustable type 66K) supplied at 25/- extra if desired.



For you and your friends this Christmas

Model W.1a for A.C. Mains 160 v. at 30 m/a. £7 2 6

Other Models available up to 350 v. at 100 m/a. All A.C. Models incorporate Westinghouse Metal Rectifier.



OUR ONLY SALESMEN ARE SATISFIED USERS

The following is from a trader:

"It is a splendid instrument, absolutely silent in operation and of the highest efficiency. I have no hesitation in recommending the 'Regentone' Unit to anyone who wants 'The Best.'"

Advt. of Regent Radio Supply Coy., 21 Bartlett's Buildings, E.C.4.

MAKE YOUR OWN CONE SPEAKER

for 7/6

THE "OBLICUT" PLAQUE OUTFIT



PROV. PAT. No. 9154

This patent plaque forms an excellent baffle for ALL cone units. It has the great advantage of being able to give the cone a free, or fixed, or lightly gripped edge, which is important. In this way it is unique, being adjustable to suit all units. Even a good earpiece or horn-type unit can be soon converted into a cone speaker worth £3 or more.

The "OBLICUT" plaque outfit includes: Patent Oblicut plaque, in oak or mahogany finish; beautifully sprayed cone, cut ready for mounting; soft iron reed and cone washers, complete with instructions. Diameter 18"

7/6 post free SEND NOW

2 FREE CIRCUITS with each order.

SOVEREIGN TWO } The cheapest and simplest
SOVEREIGN THREE } circuits yet devised.

CALYX CABINET CO. (KAY-LIX)

945 Romford Road, LONDON, E.12

Name _____
Address _____

AND FREE CIRCUITS

Please send P.O.D. post free; 1 "Oblicut" plaque outfit, oak or mahogany finish.

WEARITE COMPONENTS

WRIGHT & WEAIRE, Ltd.
740, HIGH ROAD, TOTTENHAM, N.17.

- James Special 3 Coils - 25/- pr.
- Q Aerial Coil - - - 15/- ea.
- Q Mullard Master 3 Star 15/- ,,
- Q S.P. H.F. Transformer 21/- ,,
- Q Reinartz Coil - - - 21/- ,,

WEARITE H.F. CHOKE 6/6

as used in the new COSSOR MELODY MAKER and in DR. CHAPMAN'S REINARTZ TWO

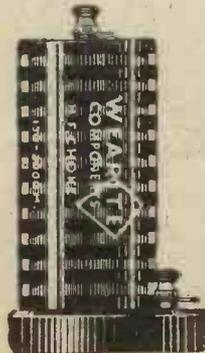
WEARITE CHOKE 4/6 (SHORT-WAVE)

WEARITE CHOKE 10/6 (HEAVY-DUTY)

- A.C. SWITCH (2-way) - 6/-
- VALVE HOLDER (A/M) 2/6

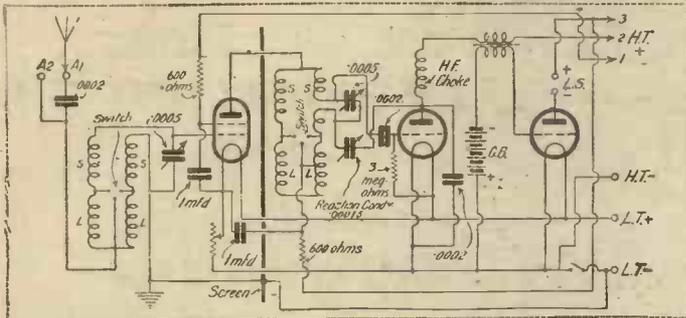
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Telephone: Tottenham 3847 and 3848

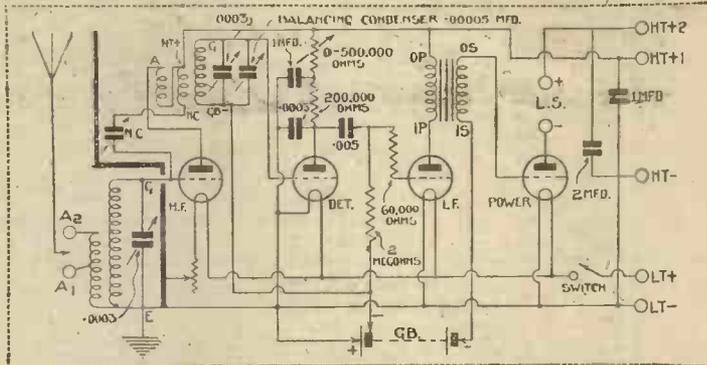


SETS FOR YOU TO BUILD

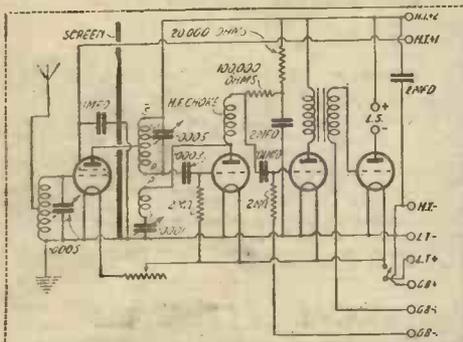
In the wide range of "A.W." and "W.M." sets all requirements are anticipated. Below details of a few of the most popular sets are given. If none of them is suitable for you, write to us giving full particulars and we will help you.



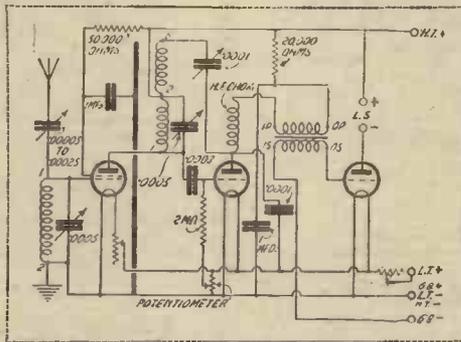
THE JAMES SPECIAL THREE.—This receiver, designed by Mr. W. James (our Research Consultant), has an exceptional performance. It incorporates new double-waveband aerial and H.F. coils—Mr. James's own design. Switching for the two wavebands is very simple. The circuit comprises screen-grid H.F., detector and transformer-coupled L.F. stages. Really inexpensive to build and run. The special coils can cheaply be made at home by the listener or can be bought.—Blueprint A.W. 156. Price 1/-.



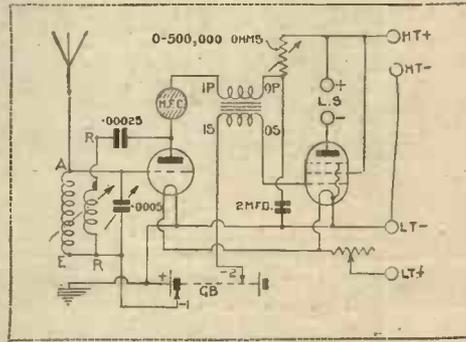
THE TOUCHSTONE.—This very remarkable receiver is also the work of Mr. W. James—the designer of the "Everyman Four." It is a four-valver, with only one tuning dial, and without adjustable reaction it will bring in, at great volume, at least thirty stations on the loud-speaker. Ordinary three-electrode valves are employed, although the coils are of special design. Ask for Blueprint W.M. 109. Price 1/6.



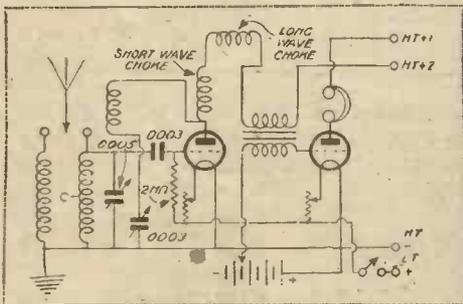
THE RANGER.—This set, on merit, has won a tremendous popularity. It is a four—with screen-grid H.F., detector and R.C. and transformer-coupled L.F. stages—designed for "ranging." It owes its special sensitivity to an improved tuned-anode coupling arrangement which, while permitting a very satisfactory degree of selectivity to be obtained, keeps the receiver stable when only a simple screening arrangement is employed.—Blueprint A.W. 145. Price 1/6



THE SCREEN-GRID "Q"-COIL 3 was specially designed by our Technical Editor, Mr. J. H. Reyner, to fulfil the wide demand for a screen-grid three-valve receiver employing "Q" coils. It therefore has the great advantages which the "Q" coils give—long and short wavebands available by the flick of a switch and reduction of direct "pick-up" are only two. The receiver is delightfully simple.—Blueprint A.W. 150. Price 1/-.



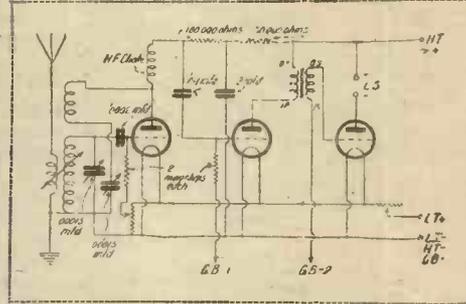
THE METEOR TWO.—Here is a set for the beginner. It is a very simple to build and easy to operate two-valver of exceptional power for only two valves. On a small indoor aerial in London it will bring in 5GB at full loud-speaker volume without interference from 2LO. It incorporates a simple all-wave tuner. Valves: detector and one L.F., transformer coupled. A good set with which to start.—Blueprint W.M. 114. Price 1/-.



THE HOME-AND-ABROAD TWO.—This highly popular "A.W." receiver largely owes its popularity to its versatility. By means of three plug-in coils, the short, medium, and long waves can be brought in. The detector valve, to which Reinartz reaction is applied, is coupled to the L.F. valve through a transformer. Short- and long-wave chokes in series solved the problem of efficient choking for all waves.—Blueprint A.W. 77. Price 1/-.

OUR BLUEPRINT SERVICE

For every published description of an "Amateur Wireless" receiver, there is available a full-size blueprint giving panel and baseboard dimensions and layouts, as well as point-to-point wiring instructions. The blueprints can be used as panel-drilling templates and form a ready reference as to the sequence of wiring. Experienced constructors can build from the blueprints alone but others are advised to obtain the issue in which the set was described. Send a P.O. and receive the blueprint by return



THE ALL-PURPOSE SHORT-WAVE THREE.—This receiver is a three-valve version of the "Home and Abroad Two." It has two L.F. stages employing the usual coupling. The design and layout are quite original and fully achieve their purpose. A very attractive Marconi-phone coil holder and adaptors for long- and short-wave coils are used. A set tested and recommended.—Blueprint A.W. 147. Price 1/-.



THE variety hour, arranged for the London studio on December 13, will include turns by Cicely Courtneidge, Harry Helmsley, the child impersonator, and Florence Oldham; on the same evening listeners will be switched over to the Palladium Music Hall for a star feature.

Moonshine is the title of a new radio show now in rehearsal for transmission from Daventry 5GB on December 22; for its interpretation well-known broadcasting artistes have been engaged.

Franz von Hoesslin, the present conductor of the Festspiel Theatre at Bayreuth (Germany), has been invited to London to direct the fifth of the B.B.C. Symphony Concerts at the Queen's Hall on December 14. The programme will consist mainly of selections from Wagner's compositions.

La Foret Bleue (The Blue Forest), an opera by François Aubert, produced at Geneva in 1912, will be heard for the first time in England when it is broadcast from 5GB on December 17; the London and Daventry stations will transmit a repeat performance on December 19.

Owing to a severe explosion which recently took place at the municipal generating station, the Rennes station, for lack of electric current, has been compelled to close down until December 10.

A relay of the Stockholm broadcast programmes is now available to owners of short-wave receivers; although for the present the transmissions are not made nightly, but at irregular intervals, the high-power station at Motala broadcasts them simultaneously on 1,363 and 99 metres.

Alleged Spurious High-frequency Chokes—Robert William Coles (32), a traveller, of Angell Road, Brixton, was charged on remand at the Lambeth Police Court on November 24 with selling high-frequency chokes to which a false trade description, namely, "Lissen," had been applied. The prosecution alleged that the prisoner knew that the articles he supplied were spurious and that he was closely concerned in their manufacture, even if he did not in fact manufacture them himself, and that the spurious product was a gross fraud upon the public, and a shocking fraud upon Lissen, Ltd., because their name was applied to an article that was absolutely useless. The prisoner was remanded for a week, bail for his appearance being fixed at one surety in £500 or two in £250 each.

A new wireless telegraphy and telephony station has been erected at Middelkerke, near Ostend, reserved for aircraft traffic crossing the English Channel. Signals can be picked up on 900, 1,400 and 1,680 metres.

FXCT is the call sign adopted by the

Major Court Treatt Sudan Expedition; the transmitter operates on 30 metres. It is stated that regular transmissions will be carried out on every Sunday evening between 6 and 8.30 p.m. G.M.T.

Pre-war Germany's only direct wireless communication was with the United States. Now Germany possesses direct communication with Argentina, Brazil, Japan, Manchuria, Siam and Sumatra.

FROM Claude Lyons, Ltd., of 76 Old Hall Street, Liverpool, we have received a copy of a 20-page booklet, profusely illustrated, dealing with the Clarostat. It is full of information and many useful circuits are given. This is free to any reader on mention of "A.W."

BROADCAST TELEPHONY

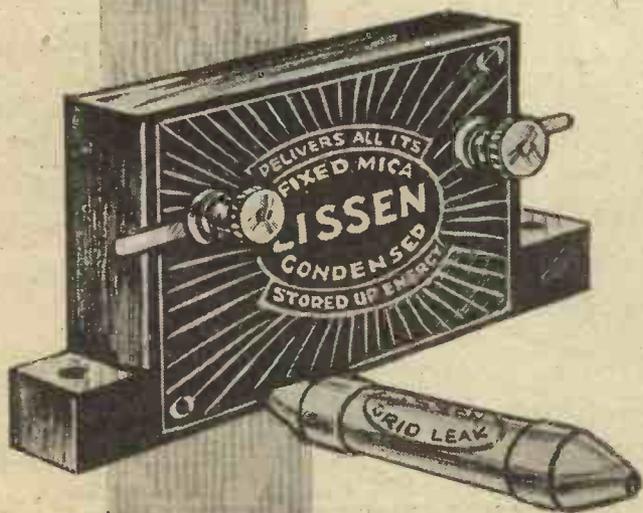
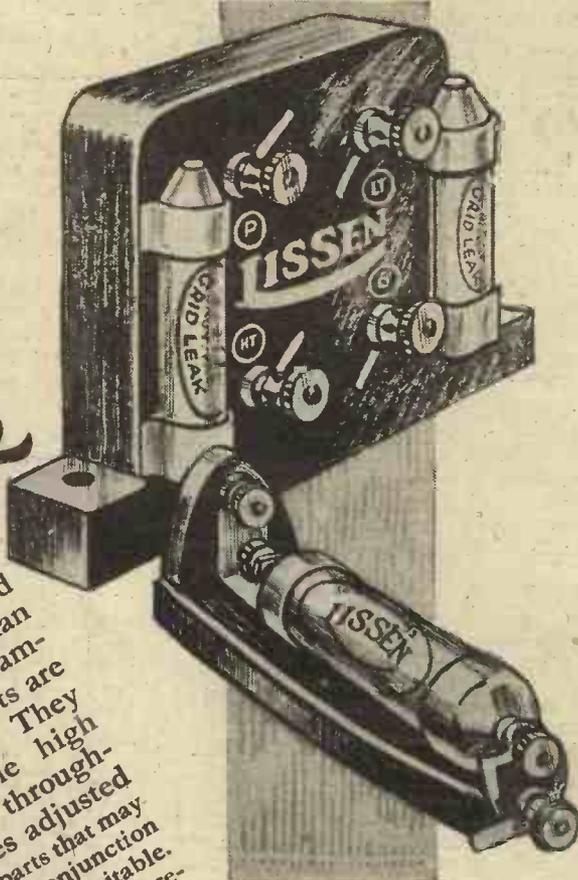
(Broadcasting stations classified by country and in order of wavelengths)

Metres	Kilo-cycles	Station and Call Sign	Power Kw.	Metres	Kilo-cycles	Station and Call Sign	Power Kw.	Metres	Kilo-cycles	Station and Call Sign	Power Kw.
GREAT BRITAIN											
24	12,500	Chelmsford (5SW)	20.0	317.7	944	Marseilles	0.5	IRISH FREE STATE			
252.1	1,190	Bradford (2LS)	0.2	322.6	931	Vitus (Paris)	2.0	319.1	940	Dublin (2RN)	1.5
273	1,099	Sheffield (6FL)	0.2	340	882	Le Petit Parisien, Paris	0.5	401	748	Cork (3CK)	1.5
285.7	1,050	Leeds (2LS)	0.2	352	852	Algiers (PTT)	2.0	ITALY			
288.7	1,039	Edinburgh (2EH)	0.2	370	811	Radio LL, Paris	1.0	258.6	1,160	Turin (test)	0.5
294.1	1,020	Stoke-on-Trent	0.2	370	811	Radio LL, Paris	1.0	534	898	Naples (Napoli)	1.5
294.1	1,020	Swansea (5ST)	0.2	389	770	Toulouse (Radio)	9.0	403	714	Genoa	3.0
294.1	1,020	Dundee (2DE)	0.2	400	750	Mont de Marsan	0.4	449	668	Rome (Roma)	3.0
294.1	1,020	Hull (6KH)	0.2	416.6	720	Grenoble (PTT)	1.5	503	596	Bolzano	0.3
297	1,010	Liverpool (6LV)	0.2	416	722	Rabat (Radio Maroc)	2.0	514.4	551	Milan	7.0
306.1	980	Belfast (2BE)	1.5	430	698	Lille (Radio Flandres)	0.25	JUGO-SLAVIA			
312.5	960	Newcastle (5NO)	1.5	462.2	649	Paris (Ecole Sup., PTT)	0.7	309.5	965	Zagreb (Agram)	1.25
326.1	920	Bournemouth (6BM)	1.5	480.7	624	Lyons (PTT)	5.0	580.2	517	Laibach	5.0
353	850	Cardiff (5WA)	1.5	1,080	277.6	Strasbourg	5.0	LATVIA			
361.4	830	London (2LO)	3.0	1,765	170	Radio Paris	8.0	526.3	570	Riga	2.0
384.6	780	Manchester (2ZY)	1.0	1,850	162	Carthage (Tunis)	2.0	LITHUANIA			
400	750	Plymouth (5PY)	0.2	2,650	113	Eiffel Tower (FL)	8.0	2,000	150	Kovno	15.0
405.4	740	Glasgow (5GC)	1.2	testing on 1,480 m. 202.6 k.							
491.8	610	Daventry EX (5GB)	24.0	GERMANY							
500	600	Aberdeen (2BD)	1.5	14,84	20.210	Nauen (AGAA)	20.0				
1,562.5	192	Daventry (5XX)	25.0	37.45	—	Doerberitz (AFK)	5.0				
*Relay stations. **Relays 2LO.											
AUSTRIA											
253.3	1,184	Linz	0.5	51	5,882	Bergedorf (AFL)	3.0				
272.4	1,101	Klagenfurt	1.5	219	1,369.8	Stettin	1.5				
277.8	1,080	Salzburg (under construction)	0.5	236.5	1,268	Munich	0.75				
294	1,020	Innsbruck	0.5	242	1,239	Nurnberg	3.0				
356.7	841	Graz	0.5	250	1,200	Maenster	1.5				
517.2	580	Vienna	15.0	251.8	1,191	Cassel	0.7				
579.1	518	Vienna	0.75	254.6	1,178	Kiel	0.7				
BELGIUM											
220	1,360	Chatelineau	0.25	271.7	1,104	Danzig	0.75				
232	1,292	Schaerbeek	0.5	274.9	1,091	Dresden	0.75				
265	1,130	Louvain (under construction)	7.0	278.8	1,075	Bremen	0.75				
275	1,090	Ghent	0.5	279.4	1,073	Kaiserslautern	1.5				
508.5	590	Brussels	1.5	283	1,060	Cologne	4.0				
also testing on high power											
CZECHO SLOVAKIA											
265	1,130	Kosice	2.4	298.2	1,006	Hanover	0.7				
300	1,000	Bratislava	0.5	303.6	988	Koenigsberg	4.0				
349.2	859	Prague (Prah)	5.0	322.2	931	Breslau	4.0				
441.1	880	Brunn (Brun)	2.4	329.7	910	Gleitwitz	10.0				
DENMARK											
337	890	Copenhagen (Kjobenhavn)	1.5	366.8	818	Leipzig	4.0				
1,153.8	260	Kalundborg	7.5	379.7	790	Stuttgart	4.0				
ESTHONIA											
408.5	735	Reval (Tallinn)	2.2	396.8	755	Hamburg	4.0				
FINLAND											
375.4	789	Helsingfors (Helsinki)	1.2	400.5	749	Aachen	0.75				
1,503	199	Lahti	20.0	429	699	Frankfurt-Main	4.0				
FRANCE											
45	6,666	Agen	0.25	468.7	640	Langenberg	25.0				
61.5	4,878	Radio LL (Paris)	1.0	483.9	620	Berlin	4.0				
158	1,899	Beziers	1.0	536.6	550	Munich	4.0				
212	1,414	Fécamp (Radio Normandie)	0.3	566	530	Augsburg	0.5				
238	1,260	Bordeaux (Radio Sud-Ouest)	2.5	574.7	522	Freiburg	0.75				
239.5	1,253	Nîmes	1.0	1,250	240	Konigswusterhausen	10.0				
245	1,224	Juan-les-Pins	0.7	1,640	181	Zeeen	20.0				
254.2	1,180	Rennes	1.5	1,829	164	Nordleich	10.0				
268.5	1,117	Lille (PTT)	0.8	2,525	119	Berlin (News)	8.0				
275	1,098	Limoges (PTT)	0.5	2,900	103	"	8.0				
288.2	1,041	Bordeaux	0.5	4,000	70	"	8.0				
289.9	1,035	Radio Lyon	1.5	HOLLAND							
299.7	1,001	Agen	0.5	18.1	—	Kootwijk (PCLL) (Wed. 12.40 G.M.T.)	30.0				
307	976	Toulouse (PTT)	2.0	31.1	—	Eindhoven	25.0				
HUNGARY											
555.5 540 Budapest 15.0											
ICELAND											
333.3 900 Reykjavik 1.0											

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THE PARTS THAT PULL TOGETHER

BUILD any published circuit entirely of Lissen parts and you will get better results than ever the original designer dreamed of. Because Lissen parts are made to pull together. They are made to the same high standard of accuracy throughout, the critical values adjusted carefully, so that many parts may be called upon to work in conjunction with one another are entirely suitable. The result is a balanced circuit that retains its original selectivity and quality of reproduction throughout its life.



LISSEN R.C.C. UNIT

Embodies a .01 condenser, which delivers all its stored-up energy and resistances that will never vary, no matter what the current load, interchangeability of resistance values.

Price 4/-

LISSEN FIXED CONDENSER

Holds its charge and delivers it without leak or loss. In any R.C.C. circuit, the condensers you use should be absolutely leak-proof, otherwise 50 per cent. of volume will be lost. Lissen condensers never leak, never vary, and they are accurate to within 5 per cent. of their marked capacity. .0001 to .001, price 1/- each. .002 to .06, price, each 1/6

LISSEN FIXED GRID LEAKS

These resistances are absolutely unvarying, no matter what the conditions or the current load. All values, ea. 1/-

LISSEN WIRE-WOUND RESISTANCES

Ohms	Price	Ohms	Price
10,000	3/6	80,000	4/6
20,000	3/6	100,000	4/6
25,000	3/6	150,000	5/6
50,000	3/6	200,000	6/-
		250,000	6/6

Use all Lissen parts in every circuit no matter what is specified and get results you could never get with mixed parts. Practically every radio dealer will help you in your use of Lissen parts.

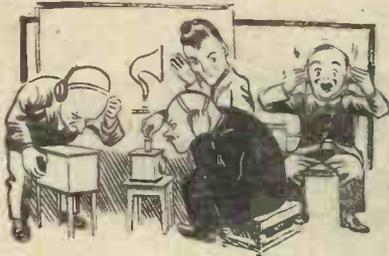
LISSEN LIMITED

16-20 FRIARS LANE, RICHMOND, SURREY
(Managing Director: THOS. N. COLE)

To Ensure Speedy Delivery, Mention "A.W." to Advertisers

MORE PROGRAMME LIMERICKS

(Continued from page 930)



TRUE

The B.B.C. calls us all "howlers,"
Us Sunday-night Continent prowlers;
But as soon as it's dark
We get nothing but Back—
Which is worse than the bite of the growlers!
B. MEREDITH.

CRUEL!

A bachelor fan, so 'tis said,
Fixed his set to listen in bed;
But the talks and wails
And the thrice-told tales
Make him think he's married instead.
R. B. DARBY.

HIGHBROW

There was once a young man who said: "Hark!
They're transmitting this row for a lark."
But his neighbour "highbrow"
Shouted gladly: "I vow
'Tis that wonderful prelude by Bach!"
G. BOSHELL.

NOT IRE-LESS!

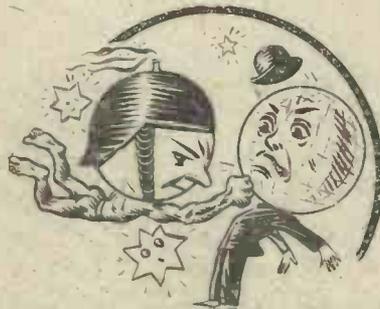
The programme director seems tireless
In pushing out "school" on the wireless;
There's too many a programme
Sans Flotsam and Jetsam
And Squire-less or Clapham and Dwyer-less.
J. J. LIVETT.

QUANTITY OR QUALITY?

The critics of programmes are many,
The satisfied ones few—if any;
But high-brows and low-brows
Can surely have no grouse
With programmes at three for a penny!
A. GOAD.

REVENGE

If the B.B.C. gets through to Mars
Look out for electrical jars;
For if Martians should hear
Their programmes—I fear
They'll make this old planet see stars!
W. E. MIDDLETON.



RESOURCE

Said the Doc. to the Nurse: "Oh, dear, dear!
There's no chloroform left, that is clear:
Switch on to the local
And, I've no doubt, folk'll
Go under with 'ether' so queer!"
J. GILMARTIN.

ONE FOR—

I tune in all stations, you know—
Rome, Paris, and even Moscow:
When put to the test,
I find that the best
Is the programme from our 2LO.
G. JONES.

WISE

A very stern critic named Bouncing
Was offered a job of announcing
By the wily B.C.,
But, wittier, he
Preferred to stick solely to trouncing.
A. H. B. PAYNE.

DISCORD!

A detector and two L.F. set
Received an "advanced" string quartet.
Cried V2: "You're distorting!"
The detector said, snorting:
"This'd wreck an eight-valve superhet!"
J. A. GRAY.

Buy a large capacity battery this Christmas

It never would do to take risks with your H.T. over Christmas. Make sure with a Marconiphone dry battery—the extra large capacity means full strength reception over a surprising number of hours. One battery bought now will last you far on into the new year, and give sparkling results all the while.



Marconiphone High Tension Batteries

66-volt, "New Standard" 12/6
81-volt, "Standard" 15/6
108-volt, "New Standard" 21/-

Large Capacity Batteries

60-volt ... 20/-

Marconiphone "Popular" Batteries

108-volt ... 15/6
66-volt ... 9/6

Marconiphone Grid Batteries

9-volt ... 1/9
16-volt ... 3/6



THE MARCONIPHONE CO. LTD.
(Dept. P.),
210-212 Tottenham Court Road,
London, W.1.

MARCONIPHONE



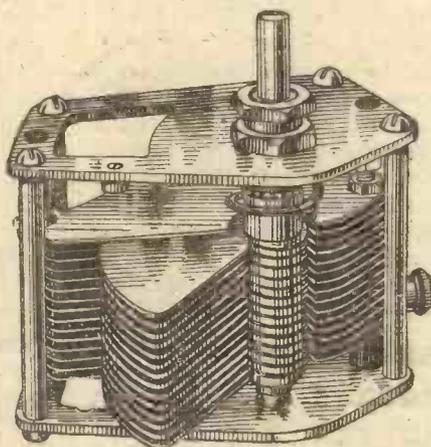
**MANY SET MANUFACTURERS
STANDARDIZE
POLAR CONDENSERS**

**FOR
"THE ALL-BRITAIN THREE"
DESCRIBED IN THIS ISSUE**

No. 3

5/9

·0005



"IDEAL"

12/6

·0005

During the past year these condensers have been chosen for the chief sets of all wireless journals. In "AMATEUR WIRELESS" alone they have been chosen for over fourteen sets.

Now Mr. Reyner has chosen them for his very latest receiver—"The All-Britain Three"—which he describes in this issue. Can you do better than follow the advice of your favourite set designer?

Wherever a variable condenser is required—be it "Reaction," "Standard," or Slow Motion—fit a Polar all-brass and get greatly improved results.

Call on your local dealer to-day and ask him for full particulars of all Polar products.

OBTAINABLE FROM ALL DEALERS.

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TELEPHONE: CITY 0332.

BROADCASTING HOUSE THE PROPOSED NEW HOME OF THE B.B.C.

THE new home of the London headquarters of the B.B.C. will, at last, be worthy of the broadcasting organisation of this country. Savoy Hill has always been a thorn in the side of any B.B.C. development,



What Broadcasting House will look like

for the present premises are too cramped and have been added to, as possible, cur-

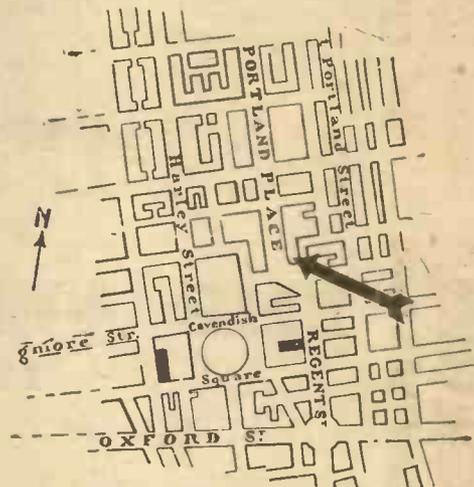
rent with broadcasting progress. The result is that there is no architectural system at Savoy Hill, and some of the departments are housed in premises in adjoining streets.

By 1931, however, all this will be changed, for the new Broadcasting House at Portland Place, Oxford Circus, will be completed. It is estimated that the new building will provide more than 100,000 square feet of useful floor space.

The provision of studios is naturally the primary consideration. Of the nine studios, four will be more than double the size of the largest studio at Savoy Hill, which is 44 ft. by 25 ft. In addition to these, there will be a "super" studio, three storeys high, which, together with its gallery, will be capable of accommodating an audience of 1,000 as well as a large orchestra. All the latest ideas of acoustical treatment are to be embodied in this studio.

The studios and their suites will be insulated from all external noise. They will be grouped one above the other in a vast central tower of heavy brickwork, ventilated artificially and shielded from street noises by the complete outer layer of offices. Wide corridors and thick brick walls will insulate the studios from the offices. In order to eliminate sound interference between studios, the central tower will contain no vertical steelwork.

To each of the four large studios will be attached a suite comprising a waiting-room, band-room, engineers' room, announcers' room, listening room, and echo room. There will be eight rehearsal



This map shows the proposed situation

rooms, six waiting-rooms, a reception suite and a special dramatic effects studio.

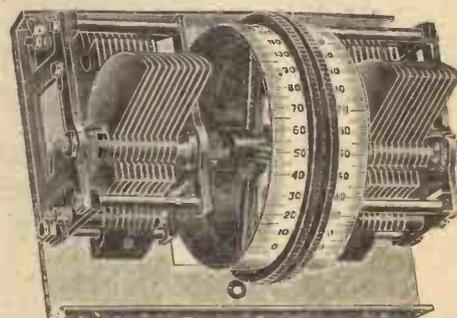
The cost of the new premises will be between £400,000 and £500,000, and the enterprise is being financed by a syndicate on terms favourable to the B.B.C., which retains an option to purchase.

IT'S the emission that matters —and the emission of the Triotron Dark Emitter filament is seven times greater than in any other valve

TRIOIRON VALVES



Cyldon Synchronatune System specified for the Binowave Four



Mr. W. James' first Screened-grid receiver, the Binowave 4, incorporates Cyldon Synchronatune Condensers. They are also specified for the Inceptor Three, the Pitman All Europe Three, and the S.G.P. Three. In fact the Cyldon Synchronatune is the only really modern tuning method.

Cyldon Synchronatune Twin '0005 mfd. assembly complete with drum and escutcheon plate as specified for the Binowave 4. PRICE 47/-

Cyldon '0003 Bébé Condenser as specified for reaction control for the Binowave 4. PRICE 11/-

CYLDON

SIDNEY S. BIRD & SONS LTD.
Cyldon Works, Enfield Town, Middlesex.

WIRELESS brings YOU Pictures NOW

—and you can receive them with any set working a loud-speaker

Pictures, perfectly defined—reproductions which have a real interest—topical news pictures with a world-wide appeal, cartoons, fashion plates, etc., are being broadcast daily in this country and from various Continental Stations. They can be received by anyone with a Fultograph connected to their set in place of the loud-speaker.

Working a Fultograph could not be a simpler operation—it has only to be substituted for the loud-speaker of any ordinary set. After that, it works itself, automatically starting when picture transmission starts, automatically stopping

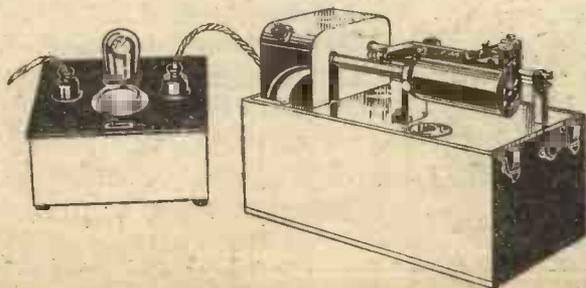
when the picture is complete. Then it can be removed and retained—neither fixing nor developing is necessary. And the price is so reasonable as to bring this latest addition to Wireless entertainments within reach of everyone.

Deliveries of Fultograph models have actually started, and will continue in increasing quantities.

Fultograph

Price of Complete Installation (excluding valve) :

In Oak £22 15s. 0d. In Mahogany £24 15s. 0d.



Wireless Pictures (1928), Ltd., Dorland House, 14-16, Regent Street, LONDON

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Best Monthly terms for all Receivers and
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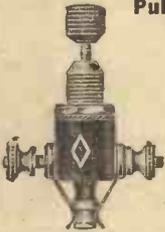
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"Best-yet" Set AW114

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Ace of Twos (D, Pentode) AW143
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"Q"-coil (D, Trans) WM62
Crusader (D, Trans) WM69
Two Daventry Two (D, Trans) WM07
Tetrode Short-wave Two (SG, D) WM09
Key-to-the-Ether Two (D, Trans) WM107
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British Station Three (HF, D, Trans) AW122
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"Q"-coil 4 (HF, D, Trans, RC) WM71
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Nothing better

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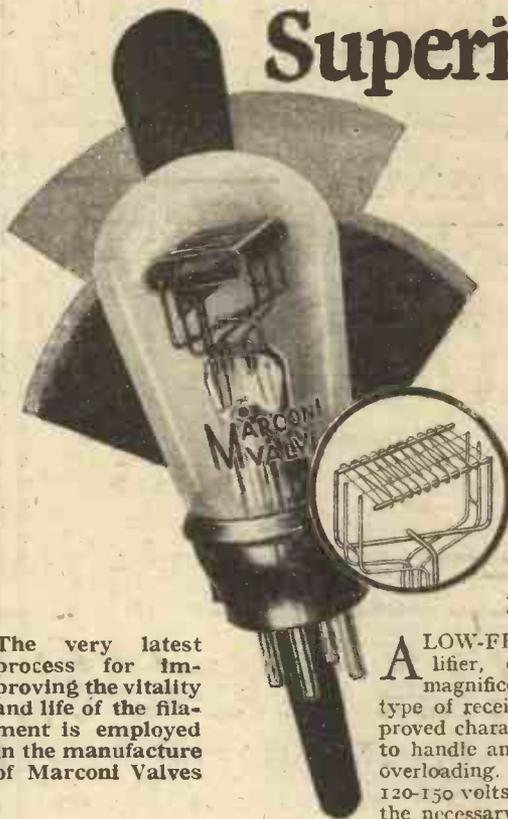


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A LOW-FREQUENCY amplifier, capable of giving magnificent volume in any type of receiving set. The improved characteristics permit it to handle ample input without overloading. When used with 120-150 volts high tension, and the necessary grid bias,

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DEP215 will give clear reproduction of music, song and speech. The filament is of the latest construction,

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PRICE 12/6

Write for full particulars of New Marconi Valves, mentioning "Amateur Wireless."

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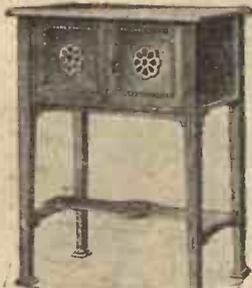
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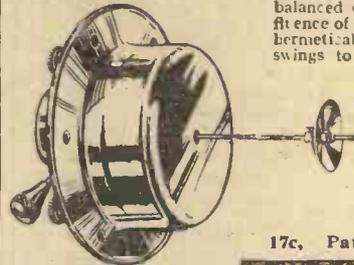
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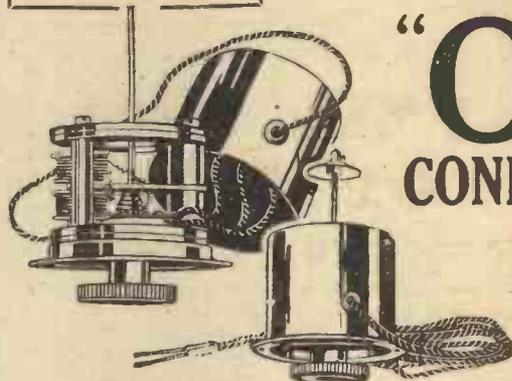
Arthur Yorke in "Amateur Wireless" says

"... results compare with instruments costing three times as much . . ."

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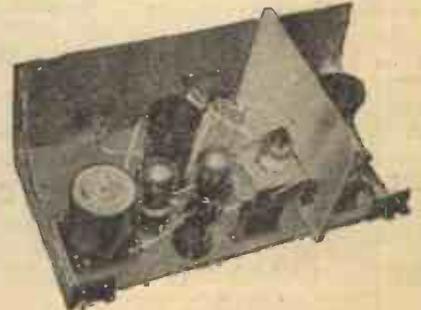
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No H.T. Battery, not even a Helleesen, will give long service when grossly overloaded.

The secret of obtaining a long life of perfect reception from a H.T. Battery is, firstly, to get a Helleesen Battery and secondly to see that you get a Helleesen of a capacity commensurate with the size and power of your set. If in doubt, get the larger size. It is a wrinkle that must have saved me pounds.

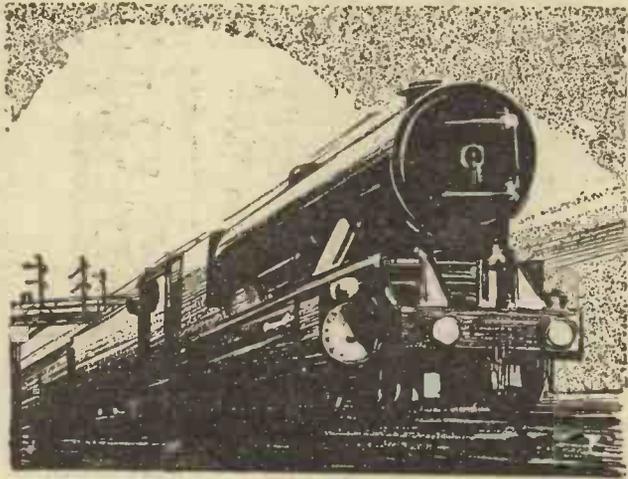
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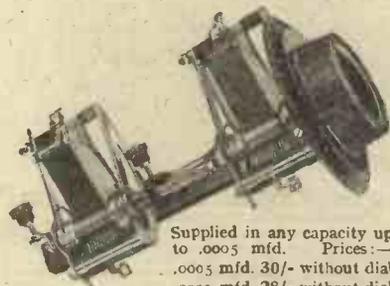


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As used by Mr. James in his "Touchstone" Receiver.



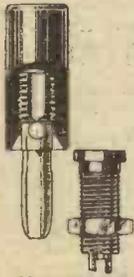
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There are no exposed wire connections, highly efficient insulation is assured, and strong contact is obtained by the application of Clix patented construction methods.

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This is the full service contact plug which enters all sockets smoothly and ensures rigid contact. The cylindrical plug is tapered to facilitate insertion. The spiral cut gives diametrical expansion and compression. 50% as efficient as a soldered joint and 100% easier to handle.

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It saves pounds in costly dry batteries and ensures an amazing clarity and purity of reception because its super efficient cells maintain

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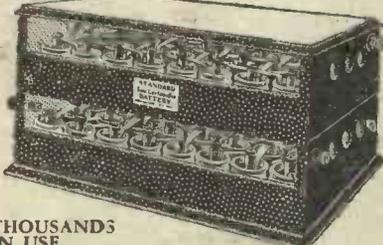
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Or Cabinets only, for Wireless. At a quarter shop prices; size 32 x 20 x 16, with double spring motor, 3 records one wind; 12 in. velvet table. Swan tonearm. Soundbox, Horn, Cups, £3. Carr. paid. All the above fittings less Cabinet, £1 15s. 6d. Cash. Motors 9s. Accessories, List Free. 54pp. Drawing and How to make Gramophones 3d. Estb. 24 years.

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Sideboard
Bifano Piano

The PANEL makes all the difference



The Panel makes all the difference

A secure foundation is the first essential of a strong building. Similarly, the panel is the first essential of a good Set. Even the best components will give poor results if they are mounted on an inferior panel. Before you choose the panel for your next Set, send for this helpful free book, "The Panel makes all the difference". It tells in interesting language and by graphic pictures the essentials of a good panel, why panels vary and how to make sure of your panel. Send the coupon for this book NOW, and learn all about Resiston, the Panel beautiful, the Panel perfect —the Panel for YOUR Set.

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RESISTON PANELS

To American Hard Rubber Co., (Britain) Ltd.,
13a, Fore Street, London, E.C.1

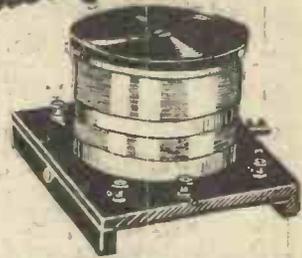
A copy of "The Panel makes all the Difference," please,
Name

Address

A.W. Dec. 8

6617

At the head of the "Queue"



FINSTON 'Q' COILS

are a very efficient type of coil with a dual wavelength covering 250/2000 metres. Made to J. H. Reyners's specification and officially approved.

AERIAL COIL ... 15/- each
H.F. TRANSFORMER ... 21/- each
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We shall supply coils for

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"Q" A 15/- and "Q" s.p. 21/-
MULLARD MASTER 3*
Dual Coil 17/6 each. 250/2000 metre.

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DUAL COILS

for **GLOBE D.X. TWO**
Each 10/6

for **COSSOR SCREENED-GRID**
Each 10/6.

for **MULLARD MASTER THREE**
Each 7/9

NEW H.F. CHOKE. A masterpiece of scientific design. Wound in 17 slots on Hollow Bakelite Former. 20/2,000 metres. Each 5/9. Minimum capacity, maximum efficiency.

TWO-PIN COILS, as always recommended in this journal. C.T. 50, 60, 75, each 2/3; 200 3/6. X types 3d. each extra plain types 9d. each less.

No Matter What is Specified
TUNEWELLS ARE BEST

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With the opening of our new gramophone saloon, another extension to our rapidly growing business, it is now possible for all lovers of music to purchase gramophone records at the same time as their wireless parts and accessories. We have already been appointed official agents for

COLUMBIA ZONOPHONE HIS MASTER'S VOICE PARLOPHONE ETC.

and other leading makes, and hold large stocks for immediate delivery

Pay a visit to our gramophone saloon, hear and choose your records in comfort.

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Solve your Xmas present problem by visiting our showrooms. What could be more acceptable as a present than a portable Gramophone, a small table grand, or a few good records. Or, if they are wireless enthusiasts, a low-priced portable set or some useful adjustments such as:

- Wet High Tension Battery
- G.E.C. Music Magnet Kit
- Cossor Melody Maker Kit
- New Master 3 Star Kit
- Mullard Portable Five Kit
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- Voltmeters
- Ampmeters
- Red Spot Loud Speaker Unit
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If you cannot call, write for our new gramophone booklet "Sound Waves from Days" or wireless booklet "Rays from Days," or our Comprehensive Catalogue, post free 6d. (free to callers).

WILL DAY LTD.

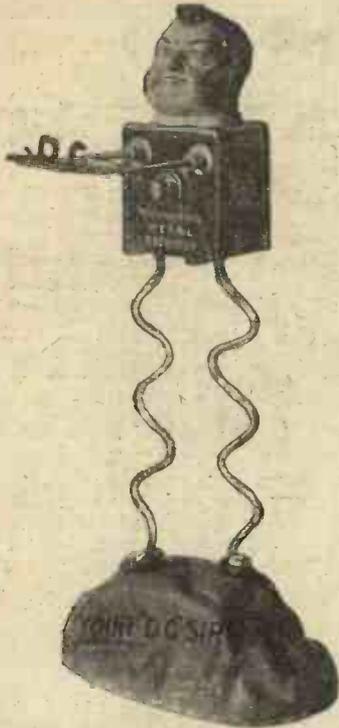
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Telephone: Regent 0921-0922

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DIRECT CURRENT FROM A.C. MAINS

For every purpose in wireless operation—

- L.T. BATTERY CHARGING
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- GRID BIAS BATTERY ELIMINATION
- SUPPLY FOR PLATES OF L.S.5a OR SIMILAR VALVES
- POT MAGNET EXCITATION FOR MOVING COIL LOUD SPEAKERS

there is a suitable

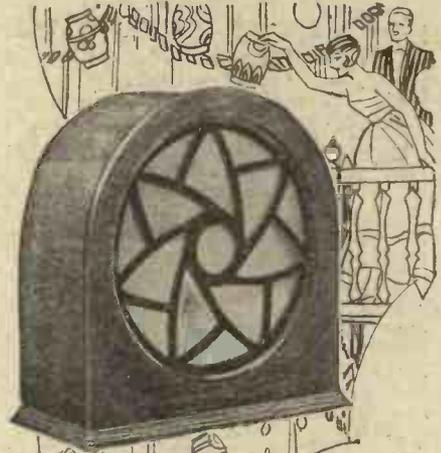


METAL RECTIFIER

which is a dry rectifying unit using neither valves nor electrolyte. It has no moving parts and there is nothing in them to wear out.

The Westinghouse Brake and Saxby Signal Co. 82 York Road London, N.1

Send 1d. Stamp with your name and address for a copy of our 24-page book: "The All Metal Way" —how to build H.T. and L.T. Eliminators and chargers.



Make that Christmas Party a success

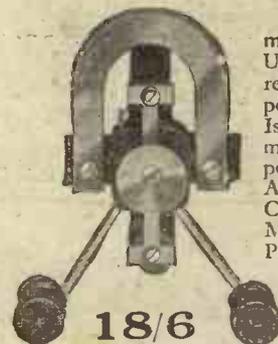


Wireless can be the very making of a Christmas Party. A Loud-speaker of pleasing tone and attractive appearance is essential for such occasions. This Whiteley Boneham Loud-speaker delights the ear and the eye and at as low a price as 47/6 can scarcely be said to touch the pocket.

It will carry melody into the farthest corners of a spacious room without allowing a trace of distortion to spoil its sweet and even tones. Compare it with other makes

and you will recognise its unequalled value.

47/6



18/6

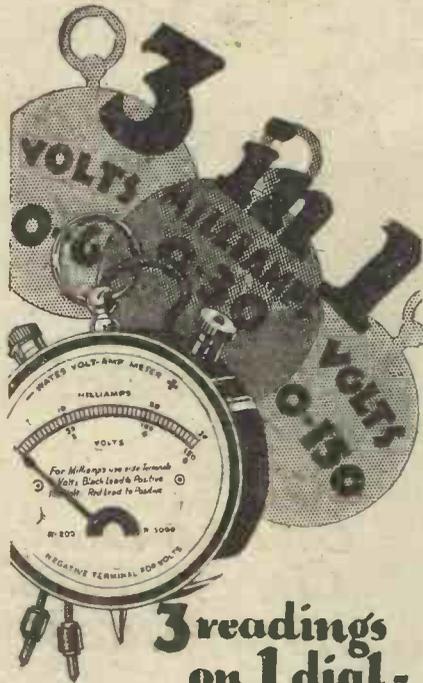
A new and remarkable Cone Unit marketed in response to a popular demand. Is entirely British made, and incorporates a Vickers-Armstrong Cobalt Steel Magnet.

Price, complete with two Belling-Lee insulated terminals.

The W.B. Anti-phonetic Valve-holder

The Whiteley Boneham Anti-phonetic Valve-holder has been specified for some of the most famous circuits of recent times, including the Six-Sixty Mystery Receiver. Price, complete with terminals, **1/6**

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3 readings on 1 dial - AN AMAZING NEW METER

ON your way home to-night, call at your usual radio dealers, and ask to inspect the wonderful new Wates Volt-amp Test Meter—the meter that has so sensationally eclipsed every preconceived notion of measuring instrument value and performance. This super meter gives three readings from one clearly engraved dial. NOW you need never buy a variety of single purpose measuring instruments—the Wates Meter is entirely sufficient for your needs, it tells you all you want to know to ensure that quality of reception, that only perfect set control can give. No valve set user should be without it. From all good-class dealers or direct complete with explanatory leaflet. Finished in attractive crystal black and nickel-plated fittings. Guaranteed dead-beat accuracy.

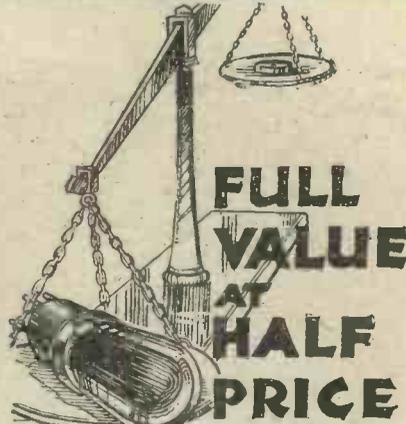
Stocked by Halfords Stores, Curry's Stores and most radio dealers.

READINGS.
 0-150 VOLTS Resistance 5,000 ohms. Dead Beat movement, crystal-talised black finish. Fully Guaranteed.
 0-6 VOLTS
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Price 8/6

THE STANDARD WET BATTERY CO. (Dept. A.W.), Head Office, Showrooms and Warehouse: 184-188 Shaftesbury Avenue (Near New Oxford St. End), London, W.C.2.

WATES three in one VOLT-AMP RADIO TEST METER

M.B.



FULL VALUE AT HALF PRICE

Talk about "Wonder Filaments," "Sets that won't work efficiently without Blank's Valves," may interest some, but it is no reason why anyone should pay enough for two valves and only get one.

You get twice the value with "Eagle" Valves, and there is a type to suit almost all circuits. Each type goes about its work in a quiet yet highly efficient manner and gives sustained service, too.

HERE ARE SOME OF THE FAVOURITES: THE NEW "EAGLE" (1929) TYPES GLOWLESS COLD EMITTERS.

Type	Volts	Fil. Curr.	Impedance	Price
Gen. Purpose, E210	2	-1	11,700	4/6
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R.F. Cplng., E206 RC	2	-08	22,000	5/6
Power Valve, E2 P	2	-15	4,200	7/3

NOTE.—Any of the above types can be obtained in either 4 or 6 volts at the same prices.

From all Dealers. Send Order Direct if any difficulty locally.

EAGLE VALVES, LTD.,
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The NEW

ETON

"FORTY-FIVE" would make an excellent Xmas Gift for your Radio friend!

Fitted in ETOBOX, the New ETON "Forty-five" Cell Primary H.T. Battery is just the kind of gift that your radio friend will appreciate this Christmas. It will save him the bother of battery charging... mess and money. A lasting and welcome gift. 3.2 Sac Type ready for use. **PRICE 1.6/6**

S.1 Sac Type, large capacity, price 1/3 6. P.1 Porous Pot Type, large capacity, price 2/2 6. The ETON 1928 De Luxe Model, 120 porous pot cells in a bank of four mahogany trays. The finest yet produced. Price **£3.10.0**

and the NEW WET CELL VALVE

1.4 volt Valves that run from Eton Leclanché Cells. The latest Radio development. H.F., L.F., R.C., 8/6. L.F.P., 9/6. The valve that eliminates accumulators. Don't change anything. Just push in Eton Wet Cell Valves and use Eton Primary Batteries. Ideal for country districts.

Full particulars of the complete ETON Range from: **THE ETON CLASS BATTERY CO.** "Eton Works," Grange Road, LEYTON

"Thanks for a jolly good battery"—Vide Customer.

90 v. for 2 valves ... 18/4
 All sizes stocked.
 Small cap. SACS ... 1/4
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 IMPROVED TYPES.
 JARS for either size 1/2 doz.



108 v. for multi-valves 39/5
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 Ready wired in polished mahogany case.
 NO EXTRAS—CARRIAGE PAID.
 Milli-amp. voltmeter 7/- post free.

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1d. Stamp brings Booklet. 6d. a Cell. 1/- full range of Samples.
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USE **EELEX**

TREBLE-DUTY TERMINALS

that will hold securely, spade, plug, pin, eye or just plain wires.
 40 different indicating tops and 6 colours, 4d. each, or without indicating tops, 3d. each.
 Write for copy of Booklet—J 66, which describes in detail all EELEX wireless accessories.
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 Constructors of receivers described in this journal should make full use of our Blueprint Service and avoid all risk of failure.

PRICE **17/6**
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Moving Coil reproduction for any set

MOVING-COIL LOUD-SPEAKER
 Outfits made by Baker's Sellin's Radio, 80 Selhurst Road, S.E.25, are unexcelled. Send for FREE 36-page Booklet—"A New Hobby"—and learn how to be certain of **PERFECT REPRODUCTION**

The Latest Scientific Discovery in CONE UNITS

The LASSOPHONE Triangle Double Reed Cone Unit is a triumph of British inventive genius and workmanship. Reproduces all frequencies equal to a Moving Coil speaker. Guaranteed not to overload on the most powerful set, and sensitive enough to work on a two-valve set. If your dealer cannot supply send P.O. 10/17/6 direct and we will forward by return.

The LASSOPHONE Triangle Double Reed Cone Unit
 Manufactured by **H. H. LASSMAN, F.R.A., A.M.I.R.E.**
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 New Prices: Jars 1/3, Sacs 1/2, Zincs 11d. Sample doz. (18 Volts) complete with bands and electrolyte 4/3, post 9d. Sample unit 8d. Illus. booklet free. Bazaar list free.
AMPLIFIERS, 30/6. 3 VALVE ALL-STATION SET 4s. A. TAYLOR, 57 Studley Road, Stockwell, LONDON

A HIGH MAST IS EQUAL TO TWO EXTRA VALVES

Everybody knows that to have a high aerial is to get extra powerful signals. The difficulty of fixing up a high aerial is banished if you fit a

P.R. PATENT STEEL MAST WIRELESS

**DAMP PROOF!
ROT PROOF!!
GALE PROOF!!!**

26 Feet high. In 3 sections of 1 1/2 in. Steel tube tapering to 1 in. Carriage, London, 1/6; Midlands, 2/6; elsewhere, 3/6. Weight 24 lb. Two masts for 28/6.

34 Feet high. In 4 sections of 1 3/4 in. Steel tube tapering to 1 in. Carriage, London, 2/-; Midlands, 3/-; elsewhere, 4/-; Weight, 34 lb. Two masts 40/-.

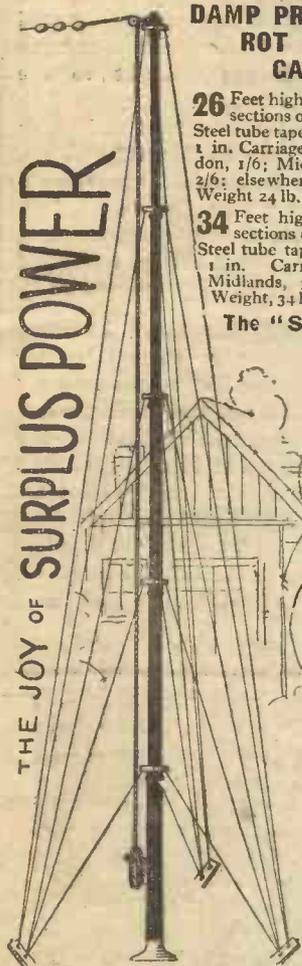
The "SUPER" Mast

42 Feet high. In 5 sections of heavy 1 1/2 in. Steel tube tapering to 1 in. A real bargain. Carriage, London, 2/6; Midlands, 3/6; elsewhere, 4/6. Weight, 46 lb. Two masts 55/-.

P.R. are made of British Steel in MASTS 9 feet lengths, from 1 1/2 in., tapering to 1 in., and are supplied with cast-iron bed plate, steel ground pegs, stay rings, galvanised steel flexible wire stays cut to lengths, pulleys, bolts, and fullest erecting instructions. No further outlay necessary.

**NO HOLES TO DIC
ONE MAN'S JOB**

THE JOY OF SURPLUS POWER



Any intelligent man can assemble and erect a P.R. Mast in a couple of hours. Our patent Mast being tapered, it is easy for anyone to raise it from the ground into position. Ordinary tubular Masts require several hands and difficult rigging to do this. To help you the wire rope is sent cut to size—a saving of endless worry. Imagine sorting out 500 ft. of rope in your back garden.

Minimum Radius 3 ft. 6 in. **GUARANTEE** Money refunded without question if not satisfied. The easiest Mast to erect.

PAINTING.

Any protective coating applied before dispatch gets so damaged by the Carriers that it is essential to paint the Mast before erection. All P.R. Masts are sent out oxide-finished ready for painting. One coat of P.R. Colloid covering applied—a 10 minutes' job—to all parts of the Mast when ready to erect sets dead hard in an hour and protects it against all weathers.

PRICE OF ACCESSORIES.

P.R. Colloid Covering sufficient for a Mast—with brush, 2/6. Halyard Log Line—Ryland's patent rot-proof: For 26-ft. Mast, 1/6. 34-ft., 2/-; 42-ft., 2/6. Per 100 ft., 3/-; Note.—Double length supplied to make lowering of Aerial easy.

A HIGHLY EFFICIENT AERIAL.

P.R. Aerial is made of 14-28 High Conductivity Pure Copper Enamelled Wire—each strand insulated from its neighbour to give the highest signal strength obtainable. 100 ft., 4/3; 50 ft., 2/3.

P. R. MASTS 17-24 PATERNOSTER SQUARE, LONDON, E.C.4. Opposite G.P.O. Tube.

IF YOU USE VALVES it will pay you to write to us for particulars of the famous 3/6 range of P.R. valves. Each valve has a written guarantee of life and performance.

The unquestioned merit of Celestion lies not only in the refined beauty of its appearance but more



Model C12

Model C12 Made under License From 15/106

in its almost unbelievable realism

CELESTION

The Very Soul of Music

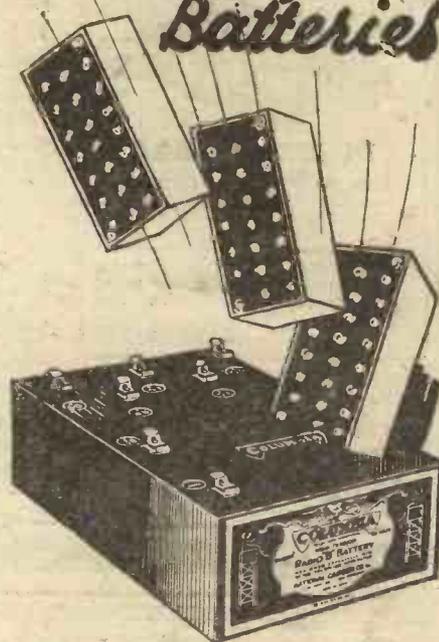
British throughout
Insist on your Dealer demonstrating or call at our

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106 VICTORIA ST, SW1
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FIRST ON MERIT—ON DEMONSTRATION



Equal to 3 Ordinary Batteries



Columbia

Not a battery, but a SUPER BATTERY—that is the correct description of the Columbia No. 4780 Triple Capacity H.T. Battery. It possesses the emission of three ordinary batteries, the lasting power of three ordinary batteries and the quality of three ordinary batteries.

For the man with the good Receiver, this Columbia battery is indispensable. You are proud of the results yielded by your receiver—you'll be prouder still when you use this Columbia battery.

60 volts. New Reduced Price £1 : 0 : 0.

This battery is specified for "Six-Sixty's Great Mystery Receiver" and for the "Touchstone" described by Mr. W. James in the *Wireless Magazine*.

Columbia RADIO BATTERIES

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SCOTLAND—

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OUR "MIDGET" SWITCH @ 10¹/₂d. and "POPULAR" @ 1/- ARE ALSO GREATLY IN DEMAND.

.....NOTICE.....
The T.S.C. Three Spring Switch originated by us is also now being incorporated in Modern Coil Circuits.

PRICE 2/- EACH

INCORPORATED AND SPECIFIED FOR THE FOLLOWING WELL-KNOWN CIRCUITS

- THE COSSOR MELODY MAKER.
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- THE DUBILIER TOREADOR THREE.
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- THE 2 H.F. EVERYMAN FOUR.
- RADIANO CIRCUITS.
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- And Many Others Too Numerous to Mention.

Obtainable from all the best dealers. In case of difficulty write direct.

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RADIO MANUFACTURERS.
9, 10, 11, CURSITOR ST., CHANCERY LANE, E.C.4.
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Send for our new 56 page catalogue and manual of instructions.

LETTERS TO THE EDITOR

The Editor does not necessarily agree with the views expressed by correspondents.

The Linen Loud-speaker

SIR,—I note your correspondent who signs himself L. P. (Launceston) asks for ideas in regard to decorating your linen loud-speaker.

I have constructed the improved model with baffle box, and permit me to endorse his remarks with emphasis as to the quality obtainable from it.

The baffle I have had made of mahogany three-ply, and I am having it polished. On the front will be fixed a fretwork grill of a design similar to a church window. This will also be french polished, and immediately behind this will be a piece of amber silk. A. W. T. (Nottingham).

The "Three-Waveband 2"

SIR,—You will be very pleased to hear that the set, "The Three-waveband 2," is a very remarkable set, and coming across the Bay of Biscay the stations on the medium wavelength simply rolled in.

I can with all faith recommend the set to anyone requiring a really good set.

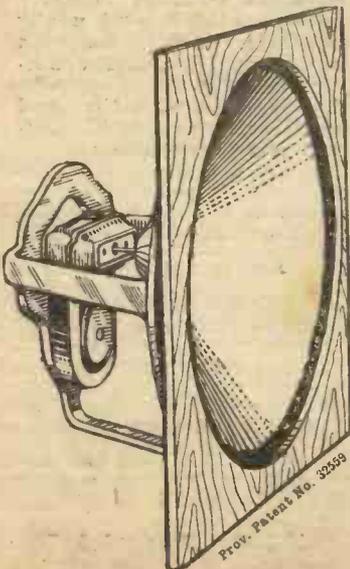
F. E. G. (ss. *Petworth*, *Vigo*).

[Owing to the demands upon our space in this issue we regret that it has been necessary to hold over a large number of letters.—Ed.]

Squire ALUMINIUM CRADLE FRAME and CONE KIT

for VARIOUS BALANCED ARMATURE SPEAKER UNITS

The frame is ready to take Blue-Spot, Triotron, Bullphone and G.E.C. Units, etc. which are secured rigidly and DIRECT to ALUMINIUM CRADLE or CHASSIS. Setting remains constant, and Speaker will take full output from set without chatter.



ALUMINIUM CRADLE FRAME

Ready to receive various Units. Designed to give easy access to nuts on reed of Unit, 12/6

CONE KIT

Comprising 11¹/₂" Kraft diaphragm (forming 9¹/₂" cone) 4 Suedlin segments, 1 card ring, all cut to size ready for mounting - - 2/6

CRADLE

Complete with Cone Kit, packed in box - 15/- Inland postage 9d. extra
A plywood clamping washer is included with a complete set.

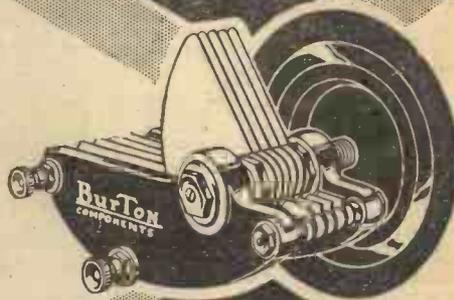
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24 Leswin Road

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Manufacturer of "SYLPHONE" Moving-coil Loud-speaker Parts

BurTON's NEUTRALISING CONDENSER THE FOREMOST IN RADIO



BASE-BOARD OR

4/-

PANEL MOUNTING TYPE

C.F.&H. BurTON PROGRESS WKS. BERNARD ST. WALSALL

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A.C. MAINS SUPPLY UNITS

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HIGH TENSION For Multi-Valve Receivers. Components from	LOW TENSION Incorporating Westing- house Metal Rectifiers. Complete Units from
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47/6

No valves required.
No expensive replace-
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2, 4 or 6 volts at 1/2 an
amp. No renewals. No
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**A valve set
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The 3 in 1 set

The Pioneer Set of Cheaper Radio

The famous LOEWE Multiple Valve
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systems in one Valve, and all the
necessary coupling elements of a 3-
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A marvel of ingenuity and efficiency,
giving loud-speaker results of ex-
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Complete with Loewe Radio Multiple
Valve, type 3 N.F. Special cable with
Wander Plugs and Spade Terminals
attached ready for connection to H.T.
and L.T.

PRICE
£4.10.0
ROYALTY
PAID
(Coils not
included)

USE A LOEWE RADIO CONE LOUD-SPEAKER
with your Loewe Set for retaining the full purity of
reproduction and a clarity that is unexcelled. Artistic
appearance. Silk front, Mahogany finish. **50/-**
The finest loud-speaker value obtainable, at
obtainable through all dealers. For illustrated leaflets write

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**The New
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SELECTOR**

PRICE **12/6** ONLY

LOCAL STATION CUT OUT

INCREASED VOLUME FROM FOREIGN STATIONS

DISTANT STATIONS WITHOUT INTERFERENCE

UNWANTED STATION CUT OUT

YOUR need is selectivity—you want to
cut out *completely* interfering stations,
either Local or Distant, and to receive any
station desired. You can do this in a minute
by fitting the Harlie Wave-Selector between
your Aerial and Set. It increases volume, too!
Whatever Set or Aerial you may have, the
Harlie Wave-Selector will increase its selec-
tivity, range and volume. You must at least
try-out this wonderful Wave-Selector. Ob-
tain it from your dealer, or request us to
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tions of our £100 guarantee.

**NO ALTERATION TO SET—JUST PLUG
AERIAL INTO SOCKET PROVIDED—
FULL PARTICULARS ARE GIVEN**

4 1/2" high, 3 1/4" diameter. In finest grade
black crystalline finish throughout.

TWO MODELS SUPPLIED:

- (a) Normal Waveband, 200-700 metres.
 - (b) High Waveband 700-2000 metres.
- Please state model required when ordering.

£100 Guarantee

Money returned in full if the "Harlie"
Wave-Selector proves unsatisfactory, and
is returned to us within 7 days of purchase.

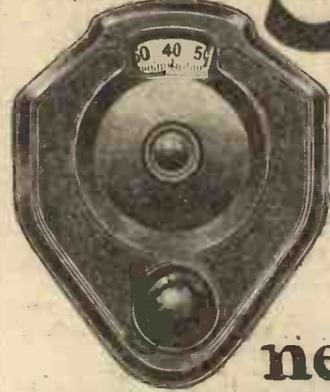
Write to Dep. H.

HARLIE Bros.

BALHAM ROAD, LOWER EDMONTON, N.9

Finished in black or
beautifully grained
mahogany

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neat- accurate and inexpensive

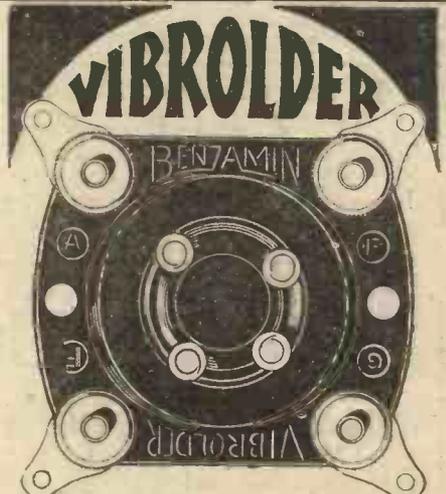
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moulded components—the "Dominion"
Vernier Dial. Special non-back-lash slow
motion drive gives very accurate turning,
while the action will fit any condenser, and
the new design of the dial will enhance the
appearance of every set.

BROWNIE

WIRELESS

"DOMINION" VERNIER DIAL

THE BROWNIE WIRELESS Co., (G.B.) LTD.
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CONSTANT CONTACT CERTAIN SAFETY

The spring sockets in the
Vibrolider ensure perfect
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These sockets also 'float'
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vibration as well as the fiercest
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COSSOR NEW MELODY

Genuine Cossor Kit of Parts
IN SEALED CARTON WITH 3 VALVES **£7-15-0**

ORMOND CONDENSERS .0005 SLF 6/- .00035 5/9. .00025, 5/6. No. 3 New Log used in Cossor .0005 6/-	VERNIER DIALS Lotus 4/9 Polar 4/9 Brownie 3/6 ALL MAKES.
SLOW MOTION DIALS Drum Control 5/- Dual Indicator 5/- Small ditto 3/6 Friction Dual 7/6	CYLDON "SYNCRATUNE" Twin Thumb Control .0005 47/- Bebe .0001 7/6 ALL CONDENSERS STOCKED.
EKCO UNITS 2 F10, DC 29/6 3 FA20, DC 50/- 1 VA20, DC 58/6 4 F60, DC 72/6	CLIMAX DC, HT UNIT ... 34/- All HT Units Stocked.

MULLARD
SCREENED GRID AND
PENTODE VALVES.
2 and 4 volt.

MULLARD
VALVES
Leading Stockist

BRANDES
Wonderful Slow-motion Variable Condensers, with Dial. .0005, 12/6; .0003, 12/-.
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LEWCOS PRODUCTS
C.T. Coils, 40, 50, 60, 75, 3/6 each; 100, 150, 200, 5/3 each. Glazite, 10d. 10 ft.; Frame Aerial Wire, 3/6 100 ft. Battery Leads, 5-way, 5/6; 6-way, 7/6; 7-way, 8/6. Binocular 6-pin Coils. B.A.C.5, 10/-; B.A.C.20, 12/-; B.S.P.5, 15/-; 20, 20/-; B.A.R.5, 10/-; B.A.R.20, 12/-; C-Coils, Aerial, 15/-; H.F. Transformers, 21/-; Touchstone, 30/- pr. For Pentode 3, Super Six-pin Coils, Etc., Stocked.

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Parts in Stock for Mullard Master Five

Unit Switch, 9/6; Pair of Climax Chokes, 15/-; Permacore Transformer, 25/- each; Pye Differential, 5/6; PM Speaker Unit, 25/-; Pye Valve Holders, 2/- each, etc., etc.

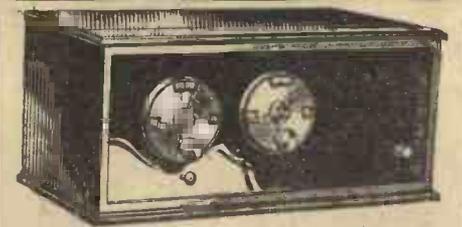
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CONCERT 4, RADIANO 3
RADIANO 4, INCEPTOR 3
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COSSOR NEW MELODY

KIT OF PARTS FOR ABOVE		With this KIT you can buy 2 B.B.C. WOUND COILS for 2/6 pr. or 2 5XX do. for 2/6 pr. With Kit Only.
Ormond push-pull switch	1 3	
2 Ormond log .0005	12 0	
2 Cossor pat. S.M. Dials	9 0	
Peto-Scott .0001	4 6	
Peerless 6 ohm	2 0	
5 W.B. Valve holders	5 0	
Wearite H.F. choke	6 6	
3 T.C.C. condensers	8 0	
Dubilier 3 meg.	2 6	
34-1 ratio L.F.	15 0	
2 v. screened grid	22 6	
2 v. power valve	12 6	
2 v. R.C. valve	10 6	
Metal cabinet, complete with terminals and strips, baseboard, wire, flex, etc., screen assembly, grid bias 9 volts, and clips for 17/6		
TOTAL	£6:8:6	
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MULLARD MASTER 3*

This new and wonderful set must appeal to Young and Old, amateur or experimenter—in fact EVERYBODY!

These Components are those
ACTUALLY AS SPECIFIED
BY MULLARDS

BEWARE SUBSTITUTES!

3 Lotus valve holders	£ s. d.
Colvern combined wave coil	3 9
Mullard Permacore, L.F.	17 6
Climax "L.F.A.," L.F.	1 5 0
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Benjamin battery switch	1 3
J.B. .0005 log variable	11 6
J.B. .00035 log variable	10 6
Mullard .0003 and 2 meg.	5 0
Mullard .0001	2 6
Magnum Brackets	2 6

£5:12:6 Carr. Pd.
(If over 150 miles Carriage Forward)

PLEASE ADD 3/6
AND I WILL
SEND WITH KIT
OF PARTS

Actual value of above Accessories is 21/-
AMERICAN TYPE ALSO IN
CABINETS **MAHOAGANY**
As shown in **20/-**
OAK **BOTH**
16/11 List 21/- **ABSOLUTELY**
WITH PARTS **BEST QUALITY**
UP TO 150 MILES CARRIAGE 1/-
OVER 150 MILES CARRIAGE FORWARD.

MULLARD VALVES 2-v. 4-v. 6-v. P.M.1 H.F. P.M.3 P.M.5X 10/6 each P.M.1 L.F. P.M.3 P.M.5X 10/6 each P.M.2 P.M.4 P.M.6 12/6 each	SPEAKERS Mullard - 53/6 Phillips - 50/- M.P.A. - 29/6 B.T.H. Cone 60/-
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H.T. BATTERIES. Siemens 103 v. 13/-;
Siemens 100 v. Power, 22/6.
L.T. BATTERIES. Exide D.F.9, 8/6;
Exide D.M.G., 11/-; D.H.9., 14/6; Oldham
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FOR
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Kit of Parts, including Panel, Strip-marked Terminals, Wire, Screws and Baseboard, (List of parts Free.) Carr. paid U.K. **£4 17 6**



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Adjustable for Portables

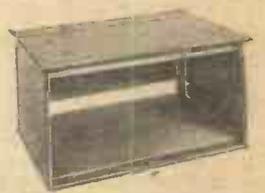
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MAGNIFICENT QUALITY OAK. LATEST DESIGN.

12 x 7	12/6
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16 x 7	17/11
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all 0" deep. Carr. Paid.



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Valve holders, 1/-; Fixed Con., 1/-, 1/8; Leaks, 1/-; Switches, 1/6, 2/8; Latest 2-way Cam. V rrier, 4/6; Rheotata, 2/6; B.B., 1/6; Lescencia, 13/8; L.F. Transformers, 8/6; O.L., 60X, 6/4; 240X, 9/6; 60-v. H.T., 7/11; 100-v., 12/11; Super 60-v., 13/6; Grid Bias, 1/6; 4.5, 5.1 Super L.F., 19/-; Variable .0003, 6/-; .0005, 6/6.

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Post 5d.
Wearite, Magnum, Lewcos.

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10x12, 10x6, 8x6, in stock.
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250/600 B.B.C., 8/6 per pair; Long Wave, 9/6 per pair. POST 1/-, pair.

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EBONITE PANELS best Grade "A" 3/16" Stocked in usual sizes or cut to special size at 4d. square Inch.

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ONLY ONE COUPON ON ANY ONE ORDER

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S.M. Dial, 100 ft. 7/22 Copper Aerial, 12 yds. Lead-in. Fuse and Holder, 12 Nickel Terminals, 60X Coil, H.F. Choke, Permanent Detector, Battery Switch, .0003 and 2-meg. Leak, 9-volt Grid Bias Panel Brackets, 6-pin Coil Base, 100 ft. Insulated Aerial, Loud Speaker Silk Cord, 30 ft. Covered Connecting Wire, Ebonite panel, 9x6. 12 yds. Twin Flex. 100 ft. Indoor Aerial.
ONLY AVAILABLE AT K. RAYMOND'S

STANDARD LOADING COILS

READY TO USE

As specified in P.W., A.W., M.W. SETS

WEARITE, BURNE-JONES, LEWCOS

7/6 each ('a'est)



SENSATIONAL OFFER IN THREE-VALVE SETS

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RECEIVES LOCAL, 5GB, 5XX AND MANY CONTINENTAL STATIONS



Please Read Below

This is the set you are looking for. It does not require pages of flowery language to describe its virtues. It is just an honest-to-goodness set, suitable for the listener who needs quality, purity of tone, and excellent results.

WE DO NOT

CLAIM 500 STATIONS IN 20 MINUTES, but do claim that at DOUBLE THE PRICE NO BETTER RECEIVER is obtainable.

OUR PRICE IS

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ASSEMBLED READY TO USE in handsome American type oak polished cabinet. HINGED LID. All components enclosed.

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3 British Valves (1 Power, Dull Emitter)

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AERIAL EQUIPMENT, GRID BIAS

LOUD-SPEAKER (Cone 12/6 extra)

100-volt H.T. BATTERY

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MULLARD D., H.T., L.F., 10s. 6d.
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The ORIGINAL MULLARD MASTER 3

Many customers still wish to build, so we repeat offer No solder—only 20 wires to connect. COMPLETE SET OF COMPONENTS. 2 Term. strips 2 1/2 x 2. Lewcoa Base, 2 I.B. condensers, Climax H.F. choke, 3 Valve Holders, Magnum Brackets, 4 Terminals, Spade Terminals, Wander Plugs, Bulgin Switch, R.I. Unit, R.I. L.F. Transformer, Mullard .0003, 2 meg. Leak, Flex, Screws, &c. And Three Mullard P.M. Valves

£5 : 17 : 6 Total

FOR 5s.

EXTRA YOU CAN BUY (with Parts only)

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Magnificent Oak or Mahogany American Type Cabinet value 25/- for 16/11 with above parts (only).

Be Sure it's RAYMOND'S

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"FAVOURITE 2"

ALL PARTS STOCKED

Ebonite Panel, .0005 Ormond S.L.F., S.M. Dial, 6-ohms, 2-way geared with 4 Terminals, long handle, 2 Lotus Valve Holders, .0003 Fixed and Series Clip, 2 meg. Leak, B.T.H. or R.I. and Varley L.F. Transformer, .0005 Fixed, Strip 4x2, 8 marked Terminals, G.B. Clips, 2 Wander Plugs, Square Wire.

The Lot 45/- Nett.

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LIST OF COMPONENTS

Ormond .0005 and .00025 Log Mid-line Condensers, 7-ohm Panel Rheostat, 3 B.R. Valve Holders, 2 Single Coil-holders, .0003 Fixed and Series Clip and Dubilier 2-meg. Leak, H.F. Choke, R.C. Dubilier Unit, R.I. Transformer, 7 marked Terminals, 2 Strips 4 x 2.

Latest Nett. Price - 57/6

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Send Detailed List for Keen Quotations

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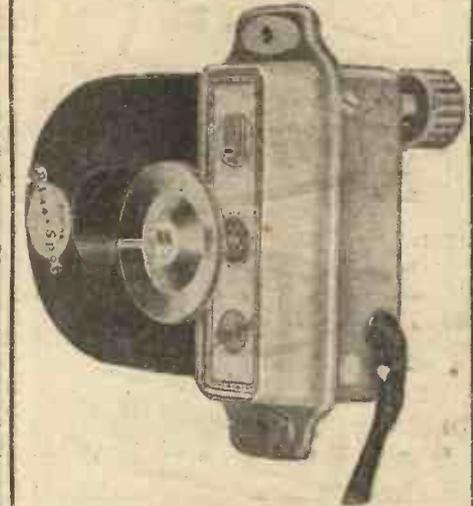
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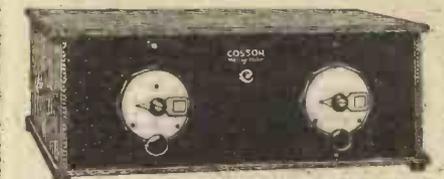
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ADJUSTABLE MODEL 4-POLE BALANCED ARMATURE

Order 25/- Early

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Still remains the "SET OF THE SEASON." THESE ARE THE SPECIFIED PARTS.

Special Price £3:19:6

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- 2 Ormond .0005
- 2 S.M. Dials
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- 2 B.B. Clips
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- 3 Lotus Valve Holders
- Ferranti A.F.3
- 2 Switches
- 9 named Terminals

And splendid PIRITE FORMER wound with double Silk Wire to specification (with improved reaction, 3/6 extra).

FOR 2/6 EXTRA

YOU CAN BUY WITH ABOVE KIT

- 21x7 Polished Panel
- 21x1 1/2 Strip
- 9-volt Grid Bias
- 20 ft. Connecting Wire
- Screws

OAK or MAHOGANY (21x7) AMERICAN TYPE CABINETS AS SHOWN, HINGED LID and Baseboard

21/- Magnificent Quality

But will be included with parts for 16/11 if purchased same time

DARIO RADIO MICRO VALVES

- 2 V General Purpose .05 amp. 5/6
- R.C.C. .06 amp. - 5/6
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WEILO L.F. TRANSFORMERS

8/6 and 11/6 TRY ONE!

THE SQUIRE ALUMINIUM CRADLE FRAME AND CONE KIT FOR VARIOUS UNITS (Balanced Armature)

CONE KIT comprising KRAFT DIAPHRAGM, CARD RING and SEGMENTS (Post 3d.) 2/6
Aluminium CRADLE FRAME; ready to use .. 12/6
Complete Lot .. 15/- (Plywood Clamping Washer Free)

**ELIMINATE
ELIMINATOR
TROUBLES
WITH A
SIFAM
ELIMETER**

DO you know the current delivered by your Mains H.T. Eliminator? Volume and quality depend entirely on the plate voltage recommended by the valve manufacturers. Without an "Elimeter" you are completely in the dark. The Sifam "Elimeter" is designed specially for this work and gives accurate dead beat readings up to 220 volts. Res. 160,000 ohms handsome metal dial. Price **30/-**

Ask your dealer and write for interesting leaflet, "What simple meters can show you," to Dept. A.W.

SIFAM ELECTRICAL INSTRUMENT Co., Ltd., Bush House, Aldwych, W.20. 300 volts external res. 35/- 500 volts external res. 37/6.

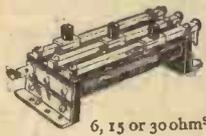


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THE LORIOSTAT
For perfect filament control.

1 way	2/-
2 "	3/9
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6, 15 or 30 ohms



As used in numerous "Amateur Wireless" receivers
A multiple unit superseding the fixed Resistor. Can be used in any circuit to perfectly and independently control any number of valves. For downright efficiency use a LORIOSTAT in your set.

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LOUD-SPEAKERS, HEADPHONES, H.T. ACCUMULATORS. Anything Wireless

Send a list of the parts you are requiring and we will send you a quotation on monthly payments.

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

"RADIO CAROLS FROM AFAR"

(Continued from page 980)

a fine transmission. Munich, on 536.6 metres, is well served by Kaiserslautern, on 279.4 metres, and Nürnberg on 242 metres. The last is, at the present time, one of the strongest and most reliable of all Continental signals.

Programmes from the Danish station Copenhagen are, on the whole, pretty well received in this country; but should there be jamming in the neighbourhood of 337 metres a change can always be made to 1,680 metres, upon which wavelength Kalundborg, the 7.5 kilowatt relay, operates.

Sweden is very well off for broadcasting stations. Stockholm, on 543.1 metres, has a very powerful infant in Motala, on 1,363.6 metres, with 20 kilowatts behind him. The programmes are also relayed by Gothenburg, on 416.6 metres; Malmoe, on 260.1 metres; and Sundsvall, on 545.5 metres.

Holland has two big stations—Hilversum, on 1,071 metres, and Huizen, which works on 340.9 metres until 5.40 p.m. and afterwards on 1,875 metres. Vienna is practically the only Austrian station well heard in this country. Radio-Wein transmits upon two wavelengths—579.1 and 517.2 metres.

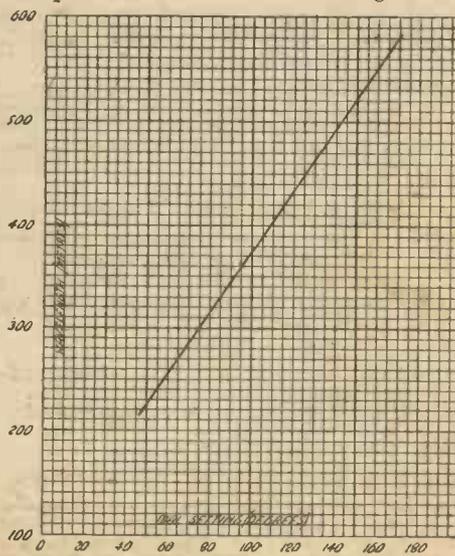
It will be seen from what has been said that the choice of Christmas stations is a wide one.

"MAKING A STATION-FINDING METER"

(Continued from page 942)

first locating the two points obtained from the known stations' wavelengths and wavemeter-dial readings, and then drawing a straight line between these two points.

If possible, a third check reading should



Calibration Chart of Station-finding Meter

be obtained, and when located on the graph this point should, of course, fall on the straight line. The wavemeter can then be brought into use for checking the wavelengths of unknown stations.

The first ROYAL AIR FORCE SALE for three years has enabled us to acquire an enormous stock of the finest Wireless and Electrical Apparatus that has ever been available to the public. All is of the highest possible grade, made regardless of cost, to W.D. tests, and is the biggest bargain ever offered to "Amateur Wireless" readers. Call if you can. The sale period is limited and orders should be placed early or you will be disappointed. Preliminary list below.

- L.T. Accumulators, celluloid, 4 volts 40 amp., 10/-.
- H.T. in ebonite, 1,000 m.a. hours, 60 volts, 19/6; 90 volts, 29/-; 120 volts, 39/-.
- 3 volts Inert Dura, 1/3. Cell Fillers, 1/6.
- Hydrometers, 1/-.
- Thermometers, 1/-.
- Transmitters, R.A.F., 1-in. spark, with A.T.I. and all fittings in polished mahogany case. Cost £15.
- Sale 15/-.
- 100 watts, 25/-; 250 watts, 50/-.
- 2-Valve Aircraft ditto, with Osram valves; speech or Morse, 40/- each.
- No. 1 Tapping Keys, open type, with massive contacts, 6/- each.
- No. 51KD. with aluminium cover, double contact, fine work, 7/6 each.
- Morse Practice Sets, with buzzer and key on mahogany panel, 8/6 each.
- Morse Recorders, for making picture receivers, 35/- each.
- Spark Gaps, 2/-.
- Receivers, R.A.F. Aircraft 3-valve Semi-portable, 1 Det., 2 L.F., 3 anti-pong holders, remote control, variable condenser, and rheostat. All tested on broadcast, 40/-.
- R.A.F. 5-valve ditto, with valves, £4, or fitted in polished mahogany cabinet, with S.M. dials, £6 10s.
- 3-valve L.F. Amplifiers, 30/-.
- Twin Loud-speaker Wire, 1/- per 100 yds.
- 2-pin Wall Plugs and Sockets, 10d.
- 8-way "Lucas" Switch, 3/6.
- Remote Tuning Controls, fitted long cord and two variable condensers and rheo., 2/-.
- Telephones, Browns' 4,000 or 2,000 ohms pairs, headband and cord, 35/- per pair; 1,500 ohms ditto, 30/-; 120 ohms ditto, 25/-.
- Sullivan L.R., 3/6 pair.
- Single Receivers, 60 ohms or 750 ohms, 10/-; 2,000 ohms, 14/-.
- Single Western or Ericsson Receivers for pick-ups, 1/6.
- Public Address Hand Microphones, 15/-.
- Wrist Micros, 12/6.
- Speech Buttons, 1/-.
- Carbon Micro. Inets, 9d.
- Skinderviken, 2/5.
- Amplion Loud-speaker Units, N, 7/6.
- Meters, Milliammeters, all ranges, 15/- to 22/6.
- 0 to 500 volts, 45/-.
- Weston Meters, all ranges to 1,600 volts, all cheap.
- Testing Sets, Elliott and other makes, E.108, 4 ranges, amps and volts, 45/-.
- A.C. Hot Wire, 1/2 amp., 4/-.
- Silvertown Salvos, 7/6.
- Weston Relays, 27/6.
- Gun Telescopes, 25/-.
- Air ditto, 27/6.
- Gyroscopes, 15/-.
- Meters, L.T. Charging, W.W., 20 volts, 5 amps., 50/-.
- L., 12 volts, 8 amps., 45/-.
- C., 18 volts, 8 amps., 65/-.
- 50 volts, 25 amps., 87/10s.
- 80 volts, 20 amps., 88/10s., and others.
- High-tension Charging Motor Generators, 200 volts, A.C. to 100 volts, 100 m.a. D.C., 70/-.
- Dynamios, 130 volts, 4 amps., 25/-.
- 250 volts, 4 amps., £3 10s.
- H.T. Anode Motor Generators, 100 volts, D.C. to 250 volts, 250 m.a., £10.
- 220 volts D.C. to 400 volts D.C., 200 m.a., £12.
- Fine brand new 2-commutator G.E.C. Aircraft Generators, 950 volts, 60 m.a. and 6 volts 5 amps., £10; 600 volts 100 m.a. and 6 volts 5 amps., £5.
- Fine Newton H.T. Generators, 1/2 k.w., 2,000 volts, £30.
- Slow speed 1-k.w. 2,000 volts, £40.
- 2-k.w. 2,000 and 4,000 volts, £52.
- Large E.V. Megger Hand Generators, 600 volts and 1,500 volts, £8.
- Medium, £5.
- Hand Magnetos, 80 volts 50 m.a., 6/-.
- H.T. 4,000 volts 1/2 mf. Mica Condensers, 10/-.
- 2,000 volts varia, in glass case, 15/-.
- Small 100-volt Motors, 10/-.
- Wheatstone Bridges, G.P.O. and dial types, from £7 10s.
- Mirror Galvos Reflecting Beam, by Paul, Gambrell, Sullivan and Tinsley, £3.
- Standard Resistance Boxes and Universal Shunts, 35/-.
- Paul Unipivots, Electrostatic Voltmeters to 5,000 volts, £8.
- Silvertown Galvos, 7/6.
- Transmitting Valves, 6-volt, 40, 100, 200, and 250 watts, from 4/6.
- Wavemeters by Townsend, Paul, Silvertown, Gambrell, and Marconi, from 15/-.
- Electric Pocket Torches, with new "Ever-Ready" Battery, 2/6.
- Airship Safety Lamps, 2-volt, 7/6.
- 25 volts to 220 volts Candle Lamps, 6d.
- Hand Lanterns, ditto, 4/6.
- Radiotor 250-watt 110-volt Lamps for charging, 2/6.
- Lucas 8-way Switches, in mahogany case, brass lid, 6 sp., 1 D.P.C.O., 1 D.P., 3/6.
- 3-amp. Wall Plugs for loud-speaker extension, 9d.
- Electric Bells, G.P.O. Circular, 2/-.
- Outdoor, 1/6.
- Large Ironclad Bells, 5/-.
- Remote Control Relays, 8/-.
- 50 Petrol Electric Generating Sets, Air Force Portable 1 k.w., 50/70 volts 20 amps., from £15.
- 150 Electric Bench and Portable Drills, from £5.
- Electric Hand Blowers, 220 volts, 17/6.
- Immersion Heaters, 110 and 220 volts, Ediswan, 2/6.
- Electric Saucepans, 5/-.
- Insulators, H.T., in porcelain and ebonite, from 6d. each.
- Empire Insulating Cloth, for coils, chokes, etc., 1/- roll, 100 in.
- 4-pin Plug and Sockets, 8d. pair.
- 2-pin Wall 50 ditto, 10d.
- Switchgear, Slow motion geared Slide Rheos, 250 w., 7/6.
- 147 S.P. Plug Boards, 9-way, 10 amp., 2/-.
- Lucas 8-way Switchboxes, 6 S.P., 1 D.P., 1 C.O., 3/6.
- S.P.C.O. Switches on porcelain, 1/6.
- H.T. Send Receivers, 2; 6; 20,000 volts, 25/-.
- Hundreds of other switches and controllers.
- Flashing Signal Lamps, Aldis, 14/6.
- C.A.V., 12/6.
- 3-colour Hand, 8/-.
- Leather Cases, 10 by 8 by 6, with strap, 5/-.
- Smaller, 2/6.
- Aerial Halliards, 6d.
- Aerial Winches, with brake, 1/6.
- Valve Boxes, 3 cell, padded, 1/4.
- Double Protectors, in leather case, 5/-.
- Instrument Cases, mahog., with brass handle, lid, and drop front, 7 by 8 by 5 1/2, each, 2/6.
- Plated angle Terminals, 10 C.A., 1d.
- Marconi T6 Table Varia Condensers, 7/6.
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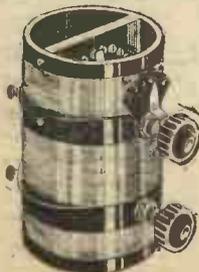
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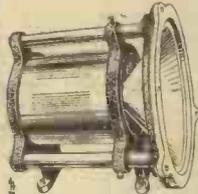
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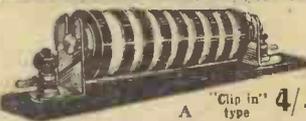
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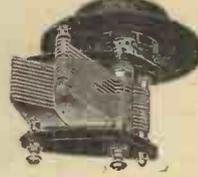
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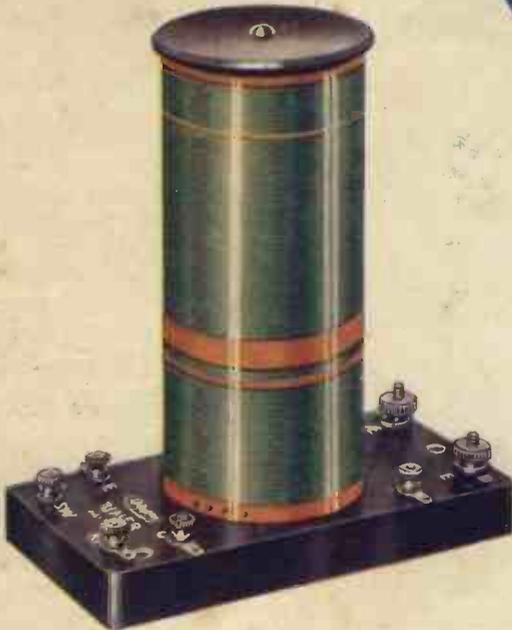
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