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SpooF Broadcasting at Christmas

Wireless Magazine

Edited by
Bernard E. Jones

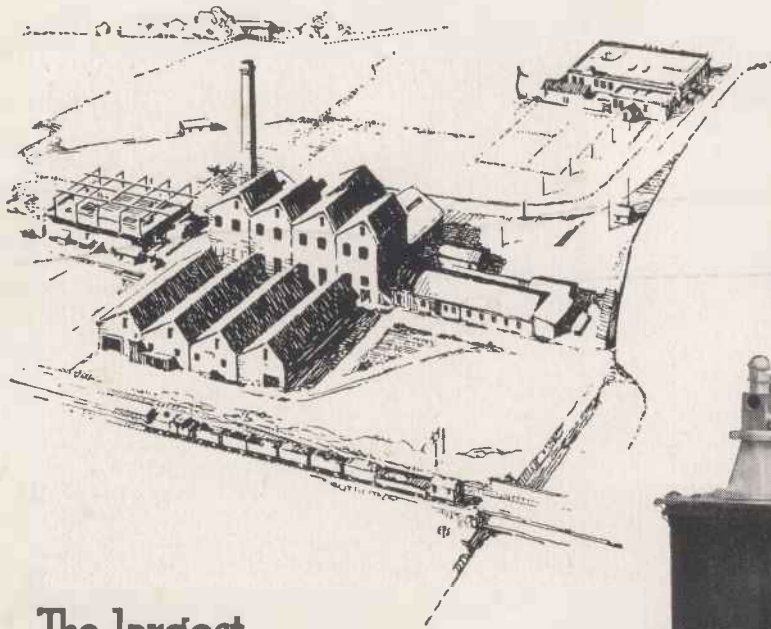
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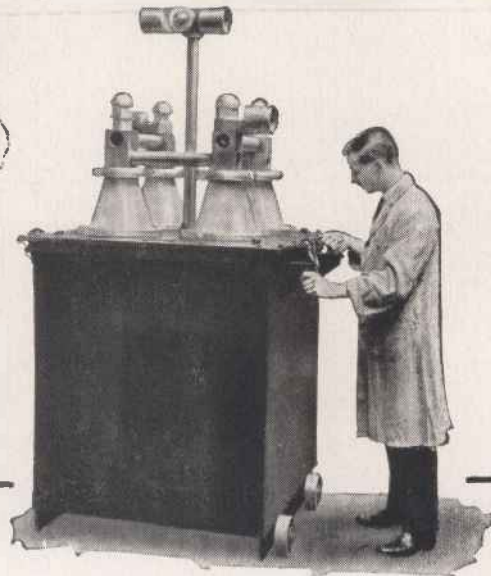


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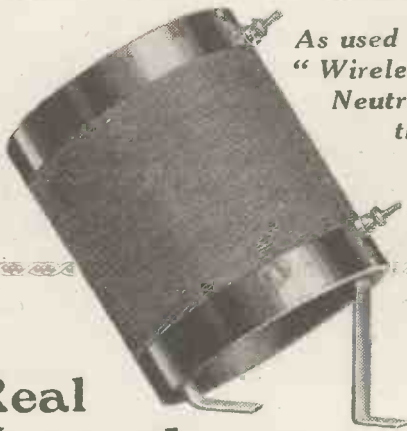
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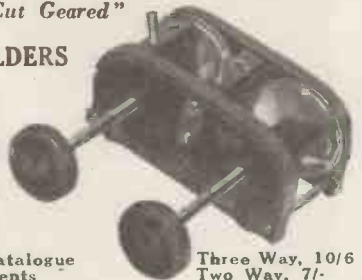
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The Wireless Magazine

December, 1925

Vol. II.

No. 11

HOME-CONSTRUCTOR SETS

- AN IMPROVED FLEWELLING ONE-VALVER. With Free Structograph Plate 445
- A FOUR-VALVE NEUTRODYNE RECEIVER. The Original Set, as announced on p. 451, is offered as a Prize in a Simple Competition 467
- A SET FOR YOUR LADY FRIENDS. A Single-Valve Set that is Simple to Operate 485
- THE BEST POSSIBLE THREE-VALVER. A Brother to "As Good A Set As Money Can Buy." 499



Perhaps it is just as well that amateurs don't have the opportunity of doing things like this when erecting their aerials!

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Announcements.—THE WIRELESS MAGAZINE, edited by Bernard E. Jones, is published about the 25th day of the month, and bears the date of the month following. One Shilling Net. Subscription rates are 15s. 6d. a year, post free; Canada, 13s. 6d. a year, post free. Contributions, accompanied by stamped and addressed envelopes, are invited. All editorial communications should be addressed to The Editor, THE WIRELESS MAGAZINE, La Belle Sauvage, London, E.C.A. Subscriptions should be addressed to The Publisher, THE WIRELESS MAGAZINE.

To My Readers!

BELIEVE me, it is not with any undue sense of my own importance that I occupy the very first editorial page of this issue with a message and a greeting to you all.

I do so rather with a sense of gratitude, with the feeling that first things should come first. I am well aware, indeed, of the kindness I have received from so many of you. Never before, may I say, have I received such congratulatory letters, and never have I been more assured of your good will. Your loyal backing-up of the efforts of myself and my staff has considerably contributed to the increasing success of this magazine.

I have been deeply interested in letters from Colonial readers, to whom, I understand, the magazine has given an entirely new wireless

gratitude has a spice of self-interest. What if it has? I dare say that in the future I shall ask many favours of my readers, and I certainly hope they will ask many favours of me, because THE WIRELESS MAGAZINE is not just a magazine—it is a service, an idea to which I should like all of you to become thoroughly accustomed—a magazine and a free service.

If you want to know anything about wireless, ask us. If you meet a practical difficulty in building or altering or testing or operating a set, give us an opportunity of getting you out of it.

You have merely to observe the simple rules enumerated on page 534 of this issue, and we will do the rest. We try hard to send replies within 48 hours, and in most cases we succeed.



A corner of "The Wireless Magazine" research and testing department.

interest; they speak enthusiastically of the sets described in my pages, and scores of them appear to have built the "As Good a Set as Money Can Buy," which was a feature of our first number.

Here, for example, is a phrase from a letter from Mr. M. W. Reade, of Johannesburg, who tells me he made this set and that "it has acted up to its reputation. I can get Cape Town (about 900 air miles) at good phone strength, and Durban (about 300 air miles) on the loud-speaker. I hope to get some more converts, as I am certain THE WIRELESS MAGAZINE is the best wireless magazine obtainable."

In a very true sense my readers have been missionaries of circulation. Every month the circulation grows, and the reason can only be that old friends are bringing in new ones. Let me express to everybody concerned my sincere thanks.

The cynic says that gratitude is only a lively sense of favours to come. Well, perhaps my

Your letters often point out that THE WIRELESS MAGAZINE is a new departure, quite different from any other wireless periodical.

My aim is to produce a magazine accurate in statement and in information, bright and interesting on every page, and with a spice of humour to leaven the whole. There is no good reason in the world why articles that are accurate need

always be tedious. In the attempt to banish tedium from my pages, my readers tell me that I have, at any rate, attained some measure of success.

I wonder how you like this present issue? I am cherishing the belief that it is the most notable Christmas Number that any wireless publication has yet put forward. Let me hear from you if you have aught of comment or criticism to pass.

A Great Wireless Christmas to you all.

The Editor, B.S.J.

A Special Article of Interest to Every Listener

SPOOF BROADCASTING

AND OTHER WIRELESS ENTERTAINMENTS

FOR THE CHRISTMAS PARTY



IT may come as a surprise to you to learn that you can carry out a most effective and mysterious piece of "home broadcasting" by means of your loud-speaker, your telephones or, preferably, another loud-speaker, and a length of twin-lead electric lighting flex.

Apparatus Needed

All that you require to do is to place one loud-speaker in one room of the house and your set in another room and connect the loud-speaker to the set with the flex. The second loud-speaker is connected to the set in the ordinary way.

If you can hide the connecting flex underneath the carpet or behind the picture rail in each room and over the rest of its course from room to room, you will add to the mysterious effect produced by your "home-broadcasting" efforts.

You may use your loud-speaker as the "microphone" and your telephones as the "receiver," or you may use one earpiece of your telephones as "microphone," and your loud-speaker as the receiver.

Let us suppose then, that you have made your disposition of parts. You proceed to the "studio" and you speak in an ordinary tone of voice right into the horn of the loud-speaker. Your listener-in in the distant room will hear every word.

An interesting variation of the experiment is to have your wireless receiving set in the "studio" and your listener-in in the listening-in room as before. You explain to the listener-in that at a certain time he will hear a certain local celebrity sing "over the wireless."

You take the said local celebrity with you into your "studio," and at the appointed time you switch off your receiving set, by means of which your listener-in has been listening to the local broadcasting station, and make the connections for your "home-broadcasting" service. You then invite your local celebrity to sing into the loud-speaker.

If you have a two-valve amplifier, you can carry out an interesting experiment in "wireless eavesdropping."

The loud-speaker is used as a microphone as before, but it is placed this time in the room where your friends are gathered.

The conversation in the room is picked up by the loud-speaker, amplified by the amplifier, and is heard by you in another room through the telephones. You may get some most entertaining variations of this "wireless-eavesdropping" experiment.

Perhaps it may be useful to add that the above experiments as carried out by the writer were done

with a high-resistance loud-speaker of a large type and telephones of high-resistance type also.

But let us leave the technical considerations of this "home broadcasting" and give our attention to the "turns."

After you have fixed up the "studio," the next thing is to select an announcer and director of programmes. This position is probably best filled by an energetic young member of the household, who will have unlimited opportunities for displaying originality in arranging the programmes.

Personal Allusions

The main point to keep in view is the "local" nature of the "transmission" by introducing into the programmes as many personal allusions as possible concerning members of the audience and the locality.

This can be done by parodies of popular songs and humorous references in the news bulletin and stock exchange report.

Few "artists" are needed providing they are versatile. A pianist is necessary, of course, as well as one or two singers and one or two instrumentalists. Many parts can be "doubled," and the entire programme can actually be run by two or three.

SpooF Broadcasting (continued)

A switch should be fitted by the loud-speaker to break the circuit at the end of each item, so that listeners-in do not hear any of the "studio" arrangements for the next item.

The announcer should write out the news bulletin and his announcement for every item, modelled as far as possible on the ordinary broadcast concerts, so that there is no delay in the programme.

Items Depend on "Artists"

The items selected must depend on the "artists" available, but if any talented musicians can be induced to perform, programmes of real artistic merit can be given. Even timid people can often be persuaded to perform to an invisible audience.

The following will be of assistance in modelling your first "home-broadcast" concert. It can be varied where necessary to keep within the limits of the "station" staff and performers:—

Time signal: This can be sent by imitating the chimes of Big Ben on gongs, glasses of water, etc., or by six dot seconds sent on the top note of a mouth organ.

Weather forecast: "A nasty low-lying depression is hanging about Hyde Park, while a sinister secondary is approaching from Chili. This will cause a considerable amount of weather, especially in the North, South-East, and

West. Temperature will rise and snow will fall. Further outlook—very dirty indeed."

First news bulletin: Copyright by Goitre, Mess Association, Derange Telegraph, and Central Booze. (Give several items of burlesque, local news and a sports summary of ping-pong, halma, and marbles matches.)

Stock exchange report: "Game was high, Balloons were up, Concrete was firm."

In one minute we shall commence our programme of Popular Piffle.

"X Y Z calling. The Royal Synco-pated Swabs Dance Band will open our programme by playing 'A little grey hole in my vest,' by Wagner." (Fox-trot, played on piano, drum effects on empty box or tambourine, and comb-and-paper or other instruments.)

Song (such as "It ain't gonna rain, no mo," composing one verse about each member of audience).

Fashion talk and some cookery hints (burlesque).

Bagpipe solo (played on model bag-pipes, which can be bought for a few pence, or with the mouth).

Voices of animals relayed by the London Zoological Gardens. (Short descriptive chat on mythical animals with illustrations of their roaring, shrieking, or whistling.)

Duet (if more than one voice be available).

Entertainer. (Humorous stories and monologues or impersonations of well-known "stars.")

Piano solo.

Dance music.

French talk (even if the accent is rather weak).

Flute solos (these can be played on a whistle-pipe, costing a few pence).

Song (classical or otherwise).

Dance music.

Relayed American concert (faint snatches of music fading in and out, with stiff brown paper continually rustled for atmospherics).

Duet.

Piano solo.

Dance music.

God Save the King.

More ambitious programmes can be planned introducing a short one-act play of about ten minutes' duration, probably specially written for the purpose, and experiments will prove the best way to produce the necessary "noises-off."

If the "studio" can be draped with

sheets it is possible to cut out a lot of the echo heard in an ordinary room.

When you give your local "transmission," rehearse all items beforehand, and get each friend to bring his or her own phones. The director of programmes after two or three concerts will at least more fully appreciate the effort of those responsible for the B.B.C. nightly programmes.

* * *

Rigging the "Wireless Thimble"

Apart from this "home broadcasting," wireless provides us with other forms of entertainment; "musical chairs," for instance, can quite well be played to music provided by the loud-speaker.

As an example of what can be done in this line the following version of an old game, which everyone will recognise, may prove of interest. Any number of players, from half a dozen upwards, may take part, and very little preparation is needed.

All the players but one sit along one side of a rectangular table. Between the two table legs, on their side, is stretched a cord, threaded on which is a small metal ring.

The set is switched on and tuned to some transmission which comes through fairly strongly. Then one side of the loud-speaker is disconnected from the set, and is joined to the end of a piece of flex. The end of another length of flex is connected to the unused loud-speaker terminal on the set.

The free end of one piece of flex is soldered to the metal ring running on the cord and the player who is not seated at the table takes the end of the other piece in one hand and sits on the opposite side of the table to the row of seated players.

The game is simply this: The players who are sitting at the table each place both their hands on the cord and pass the metal ring from one to another. This goes on until one of their number cries "Up!" when they all hold out their right hands above the



A loud-speaker in the "studio" acts as a microphone for the "home broadcast."

Wireless Entertainments for Christmas

table, towards the player sitting on the other side.

Their left hands remain grasping the cord and one of their number also grasps the metal ring. The single player now has to guess which of the people facing him holds the ring in his left hand.

When he has made up his mind he leans across the table and takes hold of the outstretched right hand of the person upon whom his choice has fallen. Should he be successful music, speech, or whatever is being transmitted, will immediately issue from the loud-speaker. Otherwise nothing will happen.

Changing Places

In this latter case the same procedure will be gone through again. When he is successful the person who is holding the ring must change places with him.

The explanation, of course, is simply that when the person holding one piece of flex touches the hand of the person holding the ring the loud-speaker circuit is completed. The current then passes from the set through the loud-speaker, along one piece of flex, through the bodies of both the persons holding hands, along the other piece of flex, and back again to the set.

As long as the signals are fairly powerful there will be little diminution in strength due to the resistance of the bodies of the two players, which is low compared with the internal resistance of the last valve of the set.

The length of flex which is connected to the metal ring must, of course, be so long that it is never stretched so tightly that it can give any clue as to the position of the ring at the moment.

* * *

Here is another wireless game for Christmas. Any number of persons can play this game but, of course, the more the merrier.

Seat all the players round a table, making one the master of ceremonies. He must be provided with a list of calls and the meanings, a paper and pencil, and the ace, two, and three of the four suits out of a pack of cards.

Each player must choose a call number, which can be duplicated if there are more than sixteen playing, and this must be written down by the M.C. opposite the initials of the person who has chosen it.

When everyone has a number, the cards must be well shuffled and placed face downwards on the table, each person taking one in turn. As this is done, the M.C. must jot down the number picked—one, two, or three—opposite the initials and call number.

Finally the messages must be read out, by someone who reads well or the effect is spoilt. Whoever gets "2 L O one" should be presented with a small prize at the end of the game.

The Calls and their Meanings

2 B D.

1. Beware of a dark and handsome male,
Who is much too fond of telling the tale.

2. You are on the eve of a big change in your fortunes.

3. That great wish of yours can only be fulfilled by very strenuous efforts on your part.

6 B M.

1. I've heard it said, your friends have sometimes found,
That empty vessels make the biggest sound.

2. You have struck the trail of good

fortune and luck will shadow you all the way along.

3. Why not make the most of that talent with which Nature has so generously endowed you?

W E A F.

1. The matter of a ring disturbs your sleep,

Look yet, a little longer—ere you leap.

2. A visit which you will take shortly will make a great difference to your present outlook on life.

3. You will soon receive an important letter of financial import.

2 Z Y.

1. 'Tis true you have been infinitely stupid,

In future seek the help of young friend Cupid.

2. The rising sun of success is clearing away the mists of misfortune.

3. Your affairs of the heart are a little tangled, but they will unravel themselves in the early days of spring.

W B 2.

1. Pull up your socks! Be blythe and gay!

For some time before the end of May

Luck will be tumbling all your way,
Proving that dogs *do* have their day.

2. Your thoughts are continually going out in one direction, but you will have to persevere if you want to succeed *there*.

3. The New Year will bring you a new friend and a new hope.



The studio "microphone" is connected to the aerial and earth terminals of the receiver.

Spoof Broadcasting (continued)

K D K A.

1. Whoever you be, when taking a lover,
Look first on the inside, and last on the cover.
2. Cultivate a little more will power and realise that ideal of yours.
3. The winds of March will blow you happy days.

3. The gambling spirit is within you. Be warned, lest it makes of you an "also ran."

W G Y.

1. Neither a borrower nor a lender be, Whene'er the name beginneth with a G.
2. You are on the eve of a romantic

You'll be lucky in love, but wanting in money.

2. A very pleasant surprise, an unpleasant piece of news, a sudden journey, and a reunion of friends—these are all for you.
3. A little less said and a little more done, would be beneficial medicine for your complaint.

5 W A.

1. Make up the quarrel, while there is time,
For rowing is human, forgiving divine.
2. Cupid is going to make a fool of you before many weeks have gone by.
3. Your prospects of success are excellent.

2 B E.

1. Your heart rules your head.
Three times you will wed.

2. You will just jog along the road of life very comfortably, with nothing much to complain of.

3. One person will dominate your life and greatly influence your fortunes.

5 N O.

1. Money and trouble for you will be mixed,
With love and a quarrel between and betwixt.

2. One turn of fortune's wheel and you will turn your back on failure.

3. Your wish will be realised.

5 X X.

1. I recommend,
To you my friend,
That charming lay,
In which they say—
"Love finds a way."

2. Your spirit of

adventure will bring you luck.

3. To that question you are forever asking yourself the answer will be—yes.

5 I T.

1. This next half year will be a most prosperous one for you and yours.

2. A little jealousy will disturb your plans for a while, but the cause will soon be removed.

3. The little god of Chance for you shall fix,
The best of luck for nineteen-twenty-six.

Here, then, are some ideas for Christmas games. Try them at your next party!



When one of them calls "Up!" all the players put their right hands above the table. The player on the right of the picture has to guess who holds the ring.

W O R.

1. Beware of that person all promise and gush,
For—a bird in the hand is worth two in the bush.
2. During the next three months you will get rather a shock concerning money matters.
3. You are one of Fortune's favourites, and you will experience both love and luck this year.

2 E H.

1. You'll soon visit Europe, and when in fair France,
You'll get for your sins, a fine taste of romance.
2. There is a disappointment near at hand concerning a visitor.

adventure caused by that artistic streak in your temperament.

3. Wait a while before you accept this proposition, for there are many things which want consideration.

2 L O.

1. Your future is extremely hard to sift,
But very soon you may expect a gift.

2. There is much festivity in front of you, including one festive occasion at which you will be the principal figure.

3. You love but are not loved.

5 S C.

1. I'm sorry to tell you life won't be all honey,

An Improved Flewelling One-valver

Employing a modified, and improved, form of Flewelling super-regenerative circuit, this single-valve set has remarkable sensitivity and is, moreover, simple to operate.

IN England the most popular circuit is undoubtedly the straight type with plain reaction on the aerial—and for all-round good results a better circuit is hard to find.

There are, however, other circuits designed for special purposes, not so well known, but which have their own particular merits.

The supersonic-heterodyne and the neutrodyne, for instance, are special circuits designed to overcome difficulties encountered in high-frequency amplification. For loud-speaker work, using a minimum number of valves, the reflex has been invented, whilst for selectivity and constant tuning with all adjustments of reaction the Cockaday and the Reinartz are respectively specialised circuits.

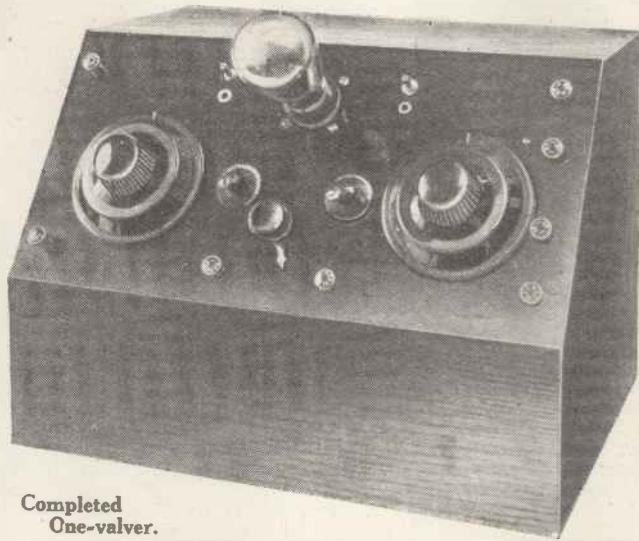
Distinctive Circuit

Similarly, in single-valvers, we find a great selection of special circuits. Amongst these the Flewelling stands out as one of distinction.

Since the introduction of the Flewelling circuit many people have suggested alterations—some of them improvements, others with additional complications. In the former class the best is undoubtedly the Bishop-Flewelling, the circuit of which is reproduced on the next page.

Use is made of one of the interesting developments in wireless reception—super-regeneration. Simple regeneration, or reaction, must not be confused with super-regeneration. There is a very definite limit to which the former can be advanced without the valve bursting into oscillation.

Furthermore, with simple reaction the point of maximum sensitivity is reached just short of self-oscillation. Consequently the receiver is rendered



Completed One-valver.

extremely unstable and is liable at any moment to "spill over."

Without going too far into technical details it may be stated that the Flewelling system of super-regeneration gives us a method whereby reaction may be pushed far beyond the normal maximum point just described.

By this method, therefore, the sensitivity of the valve is increased to a remarkable extent—an extent unobtainable from the ordinary straight circuit.

Care should be taken that none but the best components are used. This applies especially to the two variable grid leaks. Although two .006-microfarad fixed condensers are used, two having a value between .005 and .01 microfarad may be substituted, the correct value being found by experiment. It is also advisable to use a hard valve.

Components Needed

In order to construct this set, the components indicated in the following list are necessary:—

Ebonite panel, 14½ in. by 7 in. by ¼ in. thick (Paragon).

Anti-phonic valve holder (Burndeft).

2 variable grid leaks, .5 to 5 meg-ohms each (Watmel).

8 terminals (Belling Lee).

Filament rheostat (Efesca).

2 special control dials (Burndeft Super Vernier).

"Keep to the Structograph" (given free with this issue) is our advice to home-constructors who build this set; by so doing you cannot go wrong and are assured of the best results.

2 panel-mounting coil sockets.

.0005 - microfarad variable square-law condenser (Efesca).

Variometer (Igranic, type SK).

2 .006-microfarad fixed condensers (Lissen).

.0003 - microfarad fixed condenser (Dubilier).

Oak cabinet.

The cabinet, as shown in the accompanying dimensioned sketch, has a panel opening 7 in. by 14½ in., with panel-support fillets recessed ¼ in. at each end. Sufficient depth should be allowed from the front to the back in order to take the anode variometer, which is the largest of the instruments. Approximately 8 in. at the bottom and 4 in. at the top will be sufficient.

Free Structograph

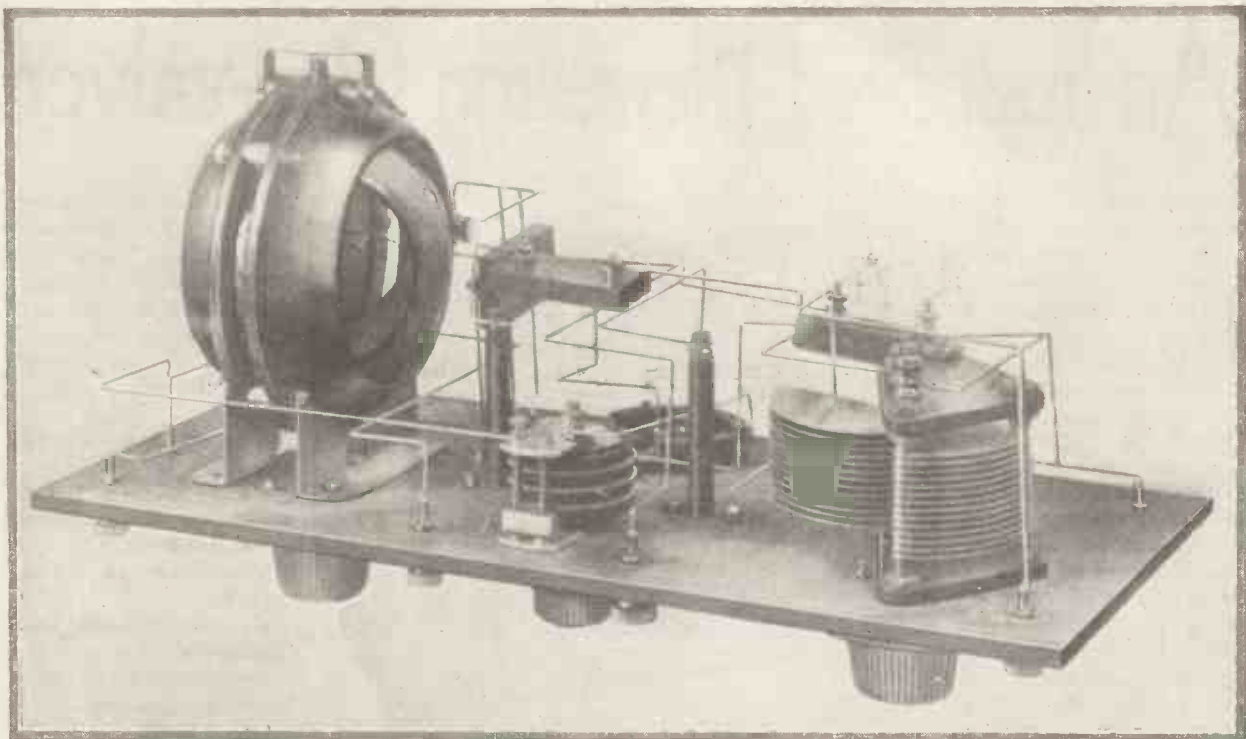
The panel-drilling dimensions are clearly shown in the coloured Structograph given with this issue of THE WIRELESS MAGAZINE.

The Structograph should be laid flat over the 14½ in. by 7 in. panel and the centres of the holes marked through with a sharp point. Great care should be taken in setting out the holes for the Burndeft dials, as the smooth operation of these depends on the correct locating of the fixing bolts.

In order to obtain a good appearance the Burndeft anti-phonic valve holder is mounted with the fixing flange at the back and the remainder projecting through the panel.

On each side of the valve holder the two fixed coil holders are mounted, whilst underneath the former are fixed the variable resistances and the filament rheostat.

The aerial and earth terminals are mounted on the left of the panel, and the H.T. and L.T. terminals on the



Photograph showing Wiring and Disposition of Components of Improved Flewelling One-valver.

right. Phone terminals are seen underneath the filament rheostat.

A careful study of the Structograph will show the positions of the components and the method of mounting them. It will be noticed, however, that the positions of the three fixed condensers as shown in the Structograph do not agree with the photographs of the set.

These condensers being small and light in weight need not be fixed to

the panel if stiff wire is used for wiring up. For the sake of clarity they have been shown in different positions in the free Structograph plate.

Wiring is fairly simple. Each terminal is shown on the Structograph marked with a small letter of the alphabet. All those marked *a*, for example, should be wired up first with one wire or as few wires as possible. Next, all those marked

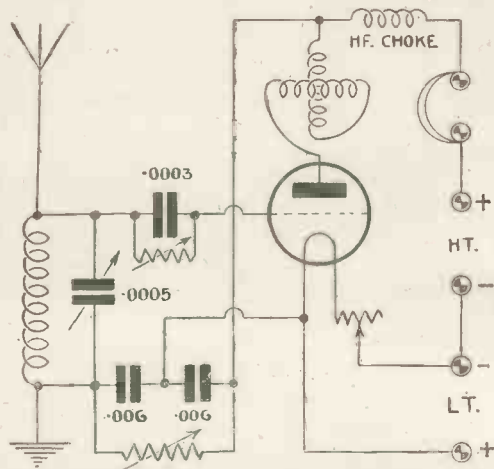
b are connected together in a similar manner, and so on.

The grid circuit of the valve is shown in black, the filament-lighting circuit in red, and the plate circuit in red and white.

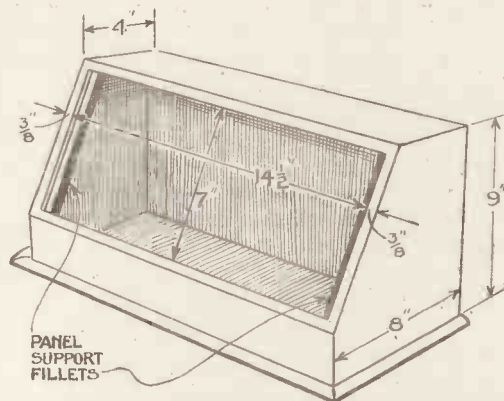
Having completed the wiring, the panel may be screwed to the cabinet and each terminal connected up for test. A very suitable valve to use is the Osram R5V.

For a 2-volt accumulator a Cosmos

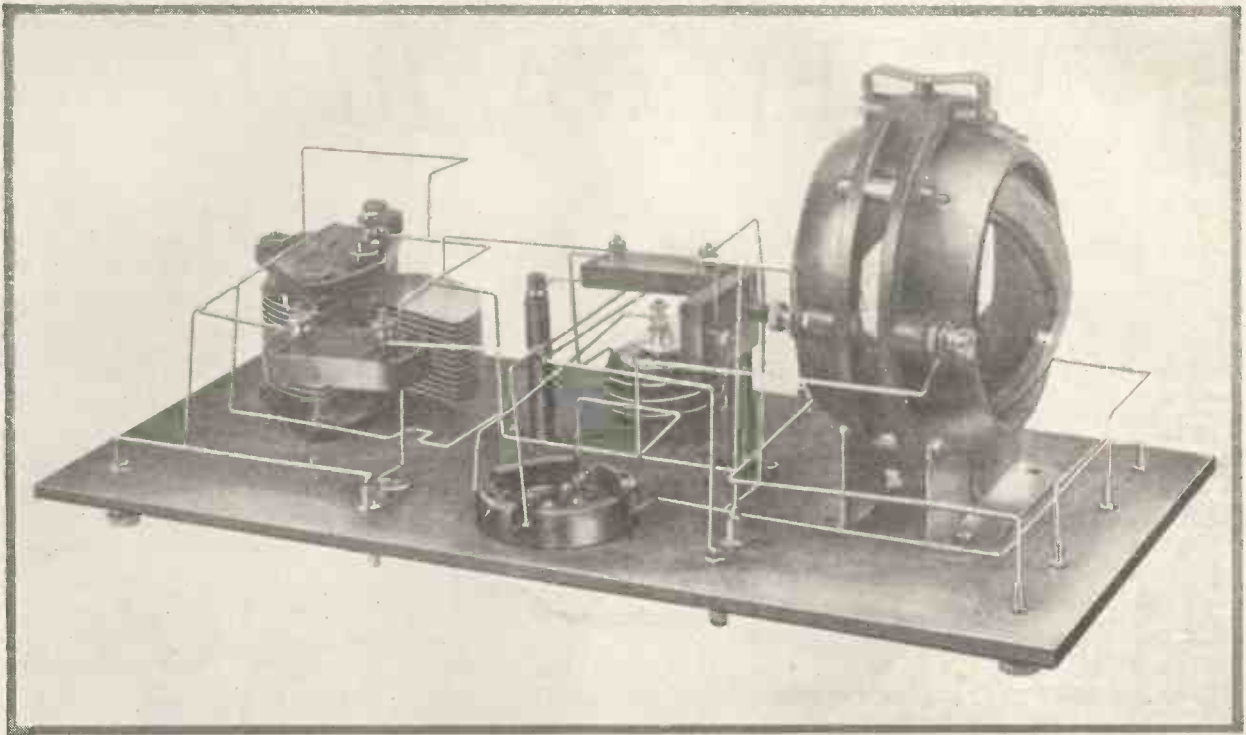
CIRCUIT DIAGRAM AND CABINET DESIGN FOR THE IMPROVED FLEWELLING ONE-VALVER



Modified and Improved Circuit of the Flewelling One-valver.



Proposed Design of Cabinet for the Improved Flewelling One-valver. Any other type of cabinet can be used if desired.



Another View of the Wiring and Disposition of Components of the Improved Flewelling One-valver.

SP.18 or a Cossor Wuncell is satisfactory. A suitable high-tension voltage will be found to be between 40 and 80 volts.

Having adjusted the brilliancy of the filament to a suitable temperature, signals are tuned-in by placing a No. 40 coil in the left-hand socket, a No. 400 in the right-hand socket, and rotating the condenser dial.

Regeneration is obtained by the variometer dial on the right. The two

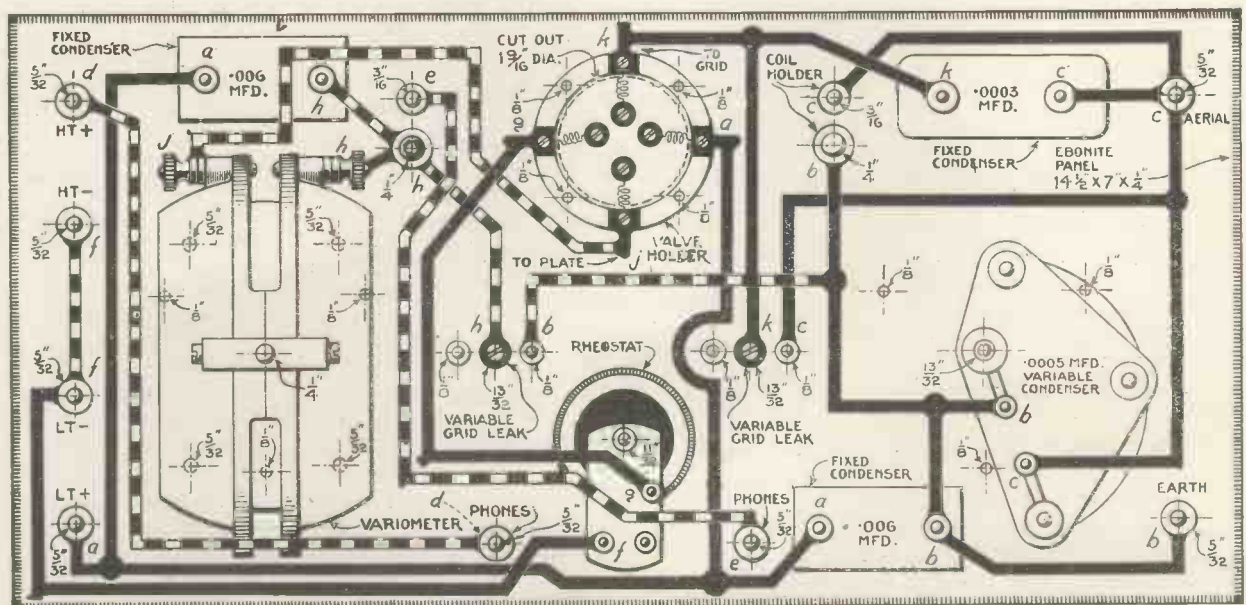
variable resistances are then adjusted until the best results are obtained.

With the Burndept super-vernier dials it will be found that a very delicate control over tuning is obtained, the dials having no backlash whatsoever, owing to their ingenious construction.

The action of a super-regenerative circuit of this type is responsible for a characteristic shrill, high-pitched whistle. As the incoming

signal is tuned-in, the adjustment of the receiver should be such that the pitch of the whistle gradually rises until it is so high as to be almost inaudible. This effect occurs at the point of maximum signal strength.

Tested on an efficient aerial and earth 8 miles from the centre of London, all the main British broadcasting stations were received. London, indeed, came through at a reasonable loud-speaker strength.

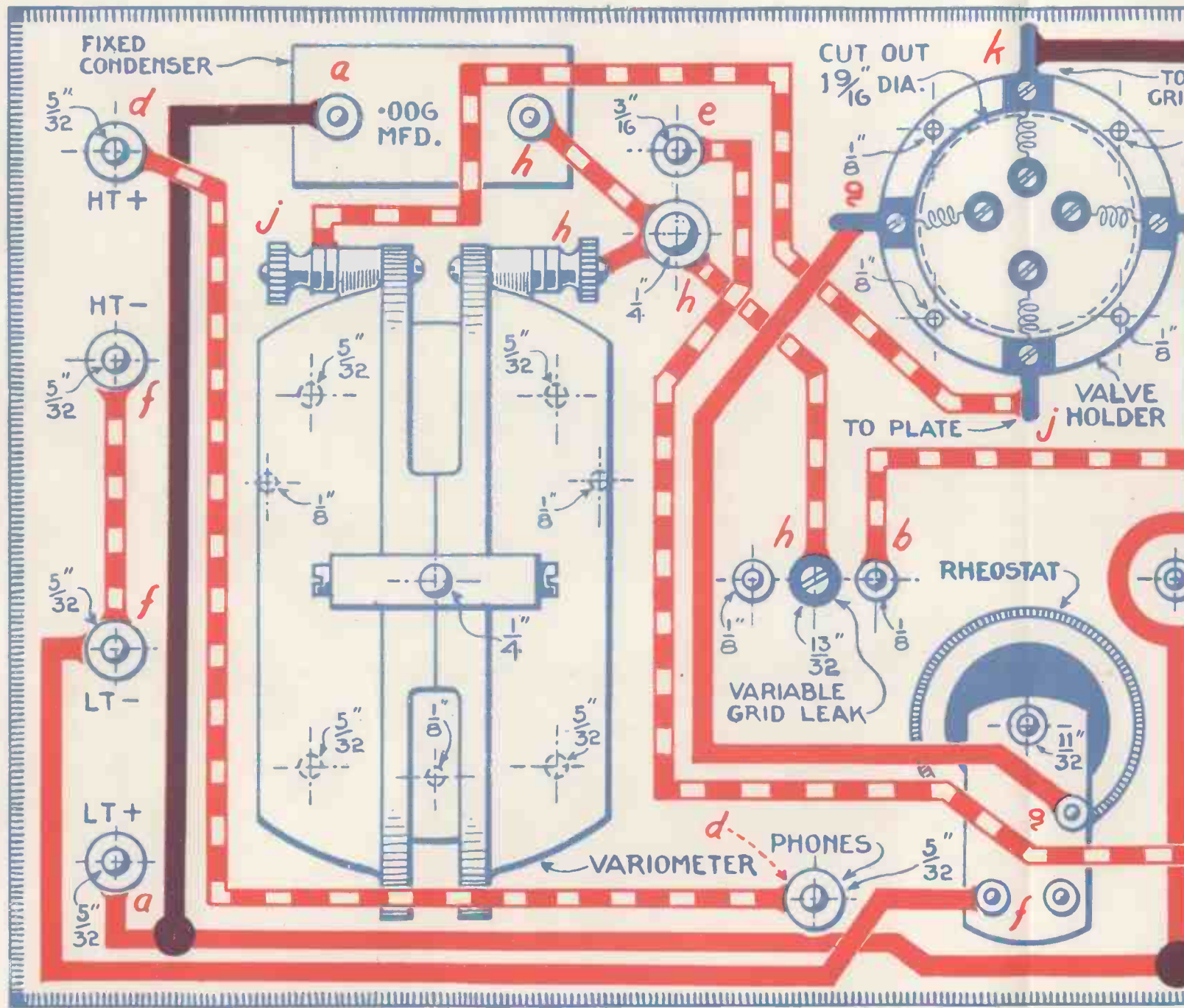


Reduced Reproduction of the Structograph Plate of the Improved Flewelling One-valver Given Free with this Issue.

AN IMPROVED FLEWELLING

Combined Drilling Template and Full-size Layout

For full particulars, see article in "The Wireless Magazine"

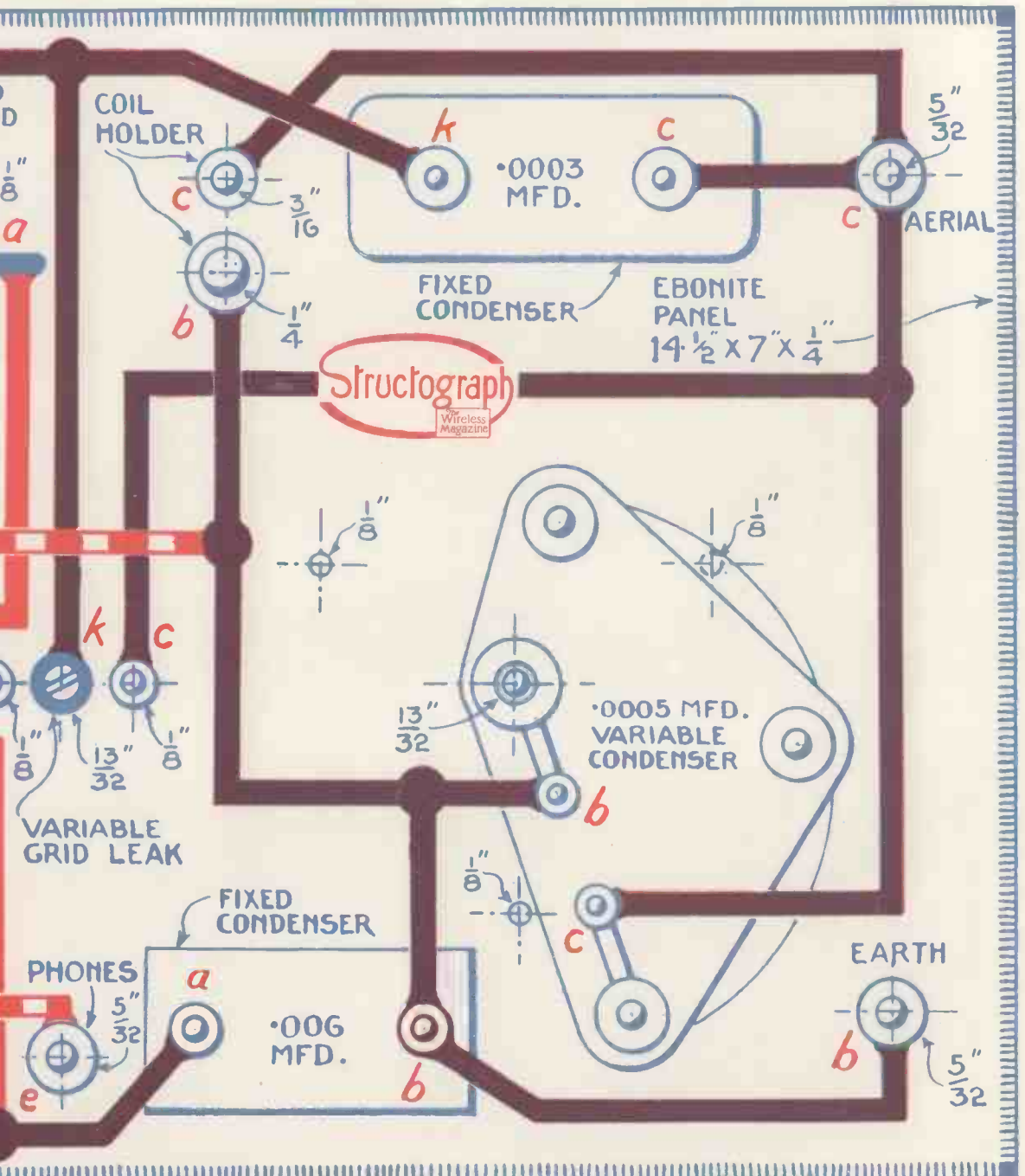


HOW TO USE THIS DIAGRAM AS A TEMPLATE :—The blue shaded outline indicates underside of panel and upperside to be laid on the panel and the drilling centres pricked through, the template thus serving many times if so required, and the **SPECIAL INSTRUCTIONS FOR WIRING** :—There is a choice of three methods. (1) Follow the wiring lines, red lines indicate the main circuit and black lines the grid circuit. A black circle at the intersection of two wires indicates that the two are soldered together. At the intersection of two wires, if you ignore the lines of the wiring, if you like, and work entirely by means of the red letters shown at the various terminals. Thus all the a's together, all the b's together, and so on, and you should do so in alphabetical order, the a's first. By this method the home-constructor both time and worry. (3) The ideal method is to combine (1) and (2).

G. ONE-VALVER

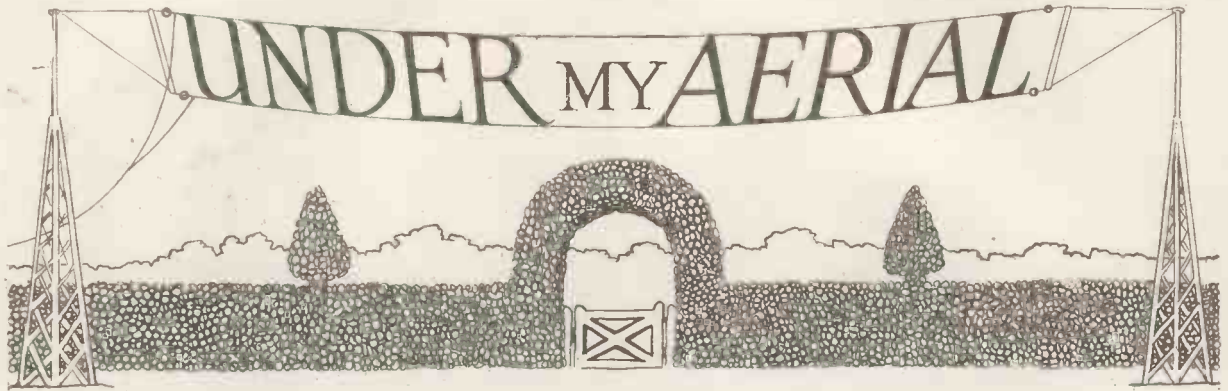
Layout and Wiring Diagram

"Wireless Magazine" for December, 1925.



of baseboard : all blue lines relate to either panel or components. This template should be retained for use as a layout and wiring diagram.

indicating the filament-lighting circuit ; red-and-white lines, the H.T. or plate circuit ; and all other intersections there is no connection between the two wires. (2) You can just connect all like letters together with one wire or with as few wires as possible, method you cannot go wrong if you are careful, it having been carefully worked out to save



A Real Wireless Christmas

TO all readers of THE WIRELESS MAGAZINE, the best of wireless good wishes for Christmas, 1925.

The coming festive season will be



Daddy's wireless Christmas.

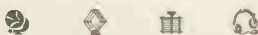
Britain's fourth wireless Christmas, and it will undoubtedly be the best wireless Christmas yet. Last Christmas the number of wireless licence holders was either just short of or just over a million. What is the number now?

No matter what the actual number of wireless licences issued to date, there is little room to doubt that ten million or more people in these islands will enjoy wireless of some kind or other this Christmas. Just think of it, one person out of every five in our islands a wireless listener-in.

To each and every one of these ten million listeners-in, the happiest of Christmases. May your sets work like Trojans during the busy holiday season, and may your aerials pick up all that is worth picking up.

If you are a crystal user, may you remember to borrow an extra pair of telephones from your neighbour with the loud-speaker. If you are a valve user, may you remember to have *both* your accumulators charged by Christmas Eve.

A happy, happy wireless Christmas.



Christmas Presents

Have you given any thought yet to the question of Christmas presents for your friends? It is not a day too soon to be considering this important question.

I always find present buying for my relations and friends at Christmas time a difficult task, except for the few to whom I can give wireless presents.

Buying wireless presents is to me the easiest of tasks, and I think it will be easier than ever this year since there is more choice than in previous years.

I have just been looking through a wireless catalogue, and I have made a list of things I might buy for Christmas presents to my wireless friends. My list is made out in what my mathematical friend calls "ascending order of magnitude." The first things on the list are the cheapest, and the prices of the various articles increase as you work down the list.

It might possibly help you if I give you a few things from my list. One of the first things on my list is an accumulator tray, acid proof, price two or three shillings. Rather a nice present to give to a wireless friend who has had the misfortune to burn a hole in the carpet with acid from his accumulator.

Other things figuring early on my list are:—hydrometer for testing accumulators, price from four shillings upwards; voltmeter, six shillings or more; pocket fault-detector, three shillings and sixpence.

One thing I have marked specially in my catalogue is a soldering set to work from an accumulator. I shall leave that catalogue about open



Christmas presents.

at the page with the blue ring round the illustration of that neat little soldering outfit. I hope somebody will take the hint and that I shall find the little outfit in my stocking.

Colds and Wireless

Have you got over your first cold of the "cold" season yet? If you have, you may possibly agree with me when I say that, when one is



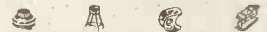
Spoilt by a sneeze.

suffering from a cold, that cold is never more annoying or discomforting than it is when one happens to be carrying out important tests in wireless reception.

Personally, I know of nothing more aggravating about a cold than being compelled to cough just as I am on the point of identifying a new and distant wireless station. It really is most terribly annoying.

I am sure that, on more than one occasion, what might conceivably have been my best piece of D.X. work has been spoilt by an irrepressible sneeze.

Has your D.X. work suffered in like manner? I expect you know the whole sequence of events as well as I do. You pick up that faint and far-distant station and you are excitedly waiting for its call-sign when *a-tish-shoo*, and the distant station has vanished for that night, if not for ever. Most annoying, isn't it?



Two Bad Colds

Speaking of colds and wireless reminds me of a disturbing but somewhat amusing experience I had the other evening. A wireless neighbour of mine whose pulling powers in wireless are as great as they are in his own profession (he is a dentist) sent for me to go round to help him to carry out comparative tests with three or four different makes

of low-frequency transformer. My dental friend had obtained these transformers on approval, and he wished to find out which one suited his two-valve set the best.

I had a fairly bad cold on me at the time, and I wondered whether I ought to go, but when I got to the dentist's house I found that he had quite as bad a cold as I had.

Things went along all right while we were working with the two-valve set. When we added a two-valve amplifier, however, we began to experience the disturbing effects of a bad cough, or rather of two bad coughs.

The two-valve set consisted of a detector valve and a low-frequency amplifying valve, so that, when we added the two-valve amplifier, we had a detector valve followed by three low-frequency amplifying valves.

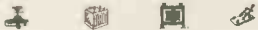
All the valves were of the two-volt dull-emitter type, and I never ran across such a microphonic lot. Just when we had got one of the new transformers in position between the detector valve and the first amplifying valve and were straining our ears to get comparative results, one of us would cough, and—ping! the loud-speaker would start and go on pinging on one steady note for half a minute or more.



He had a cold as bad.

We tried packing the valves round with cotton wool, but it was of no avail. I pretty nearly burst my lungs trying to repress my tendency to cough at the critical moment.

Take my advice over this little matter. Never attempt to carry out ear tests with a microphonic multi-valve set when you are suffering from a nasty cough.



Less Stations

I hope that you are not unduly worried by the persistent rumours that some, if not all, of the relay stations are to be closed down. If the congestion in the European ether does eventually make it necessary to do away with the relay stations, we are promised compensation in the shape of increased power at our main broadcasting stations.

Since 5 X X has become established at Daventry, we have seen what an up-to-date high-power station can give us both in the way of crystal and valve reception.



The power of 5 X X.

I suppose that none of us would grumble were the closing of the relay stations to be followed by an immediate increase in the power of the main broadcasting stations to something like the present power of 5 X X.

Crystal users all over the country would have little to complain of with such a "balance of power," but what about the weather?

Wouldn't the old weather croakers be able to croak about the effect of wireless on the weather if all our main broadcasting stations had the power of the present 5 X X?



Cleaning Up for Christmas

Have you overhauled your wireless apparatus for the busy winter season yet? It is high time that you carried out that important piece of work, for it will not be long before Christmas is upon you and your house is full night after night with new and eager listeners.

There is nothing like a thorough autumn or early winter clean-up of a wireless set for ensuring good reception throughout the busy wireless season of which Christmas is the mid and culminating point.

Cleaning up a wireless installation divides itself naturally into two parts, the work outside and the work inside. For the work outside, I would suggest a bright, sunny afternoon. There are such afternoons even in December. For the inside work I would suggest daylight rather than artificial light. You will notice that

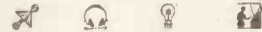


Cleaning up for Christmas.

the same idea is behind these two suggestions, namely, a thoroughly good light in which to carry out your work of careful inspection.

I have one wireless friend who

makes a point of putting up a new aerial wire every December, and who practically re-wires his three-valve set each year about the same time. He believes in leaving nothing to chance for the busy wireless season, and there is much to be said for such a belief.



Pulleys and Insulators

Before leaving the subject of a thoroughly good overhaul of your wireless equipment, I should like to suggest to you that you pay special attention to your aerial pulleys and insulators this winter.

My old gardener tells me that we are in for a hard winter. If he is a true weather prophet, your outside aerial equipment will have more to withstand in the way of weather than it had last winter.

When I have determined to carry out an examination of my aerial, I have on occasions found a good pair of binoculars most useful. With a pair of good glasses you can generally see whether it is necessary to let the aerial down or not. At any rate a pair of binoculars will enable you to examine the pulley at the top of your aerial mast.

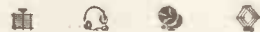
If you deem it essential to let down your aerial, I would most strongly recommend you to clean



Found binoculars most useful.

the insulators and examine them carefully. Do not hesitate to replace a cracked insulator. It will pay you to do so.

Be very critical of the rope by which you hoist your aerial. If that rope is weak, it will surely let your aerial and you down at some vital moment, such as when John Henry is going to tell us the story of the man who burnt his breeches.



How Much do you Spend on Wireless?

A dabbler in numbers connected with the N.A.R.M.A.T. has worked out that the wireless public of Great Britain spends something like ten million pounds per annum on wireless apparatus. The same expert, in addition, calculates that there are seven million listeners in the country.

If these figures are correct, it means that, roughly speaking, the average amount spent each year on wireless apparatus by the wireless enthusiast is thirty shillings.

How does this amount compare with what you actually spend in a year on wireless? My yearly wireless bill works out nearer thirty pounds than thirty shillings. Why, I spend over thirty shillings a year in having my accumulators charged!

Perhaps your experience of the cost of wireless has been something like mine. During your first year of wireless you were no doubt happy and content with a simple crystal set. The initial cost was, say, a couple of pounds, the annual upkeep next to nothing.

During your second year of wireless enthusiasm, you went in for a single-valve set, the cost being a matter of a few pounds. Your annual expenses, including the cost of charging your accumulators, rose considerably.

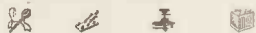
If you went on as I did, to launch out as a serious experimenter, your



Your expenses go up.

annual expenses went up by leaps and bounds.

Is wireless worth what it costs you? If your wireless experience is anything at all like mine, you will say that there is nothing else in which you get the value for money that wireless gives you.



A Wireless Christmas Club

"Looking forward to a good wireless Christmas, George?" I asked my irrepressible wireless friend the other evening.

"Very much so," replied George.

"Glad to hear it. Hope your stocking will be well filled with the best of wireless parts and parcels."

"My dear sir, the last time I hung my stocking up on Christmas Eve somebody put a charged accumulator in it in a slanting or oblique position! The acid trickled out, ate its way through the stocking, and the accumulator fell to the bedroom floor. The acid continued to leak out, and by morning it had eaten a hole through the bedroom carpet, through the bedroom floor and part way through the plaster underneath.

I was only just in time to prevent the accumulator from falling through on to the dining room table beneath. No, I never hang up my stocking now of a Christmas eve."



The wireless club at the Golden Switch.

"Then you can't expect any wireless presents."

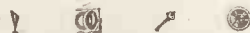
"Can't I?" As a matter of fact I am expecting this Christmas a couple of the new geared variable condensers, half a dozen anti-ping-pong valve-holders, a new hornless loud-speaker, a seven-valve super-whooper heterodyne, etcetera, etcetera."

"Good gracious, who is giving you all those things?"

"No less a distinguished person than myself."

"How silly."

"It is not silly at all. Last February I joined the wireless Christmas club at the Golden Switch and I have paid half-a-crown a week into that club. In a few days I shall be drawing my coupons. I calculate that I shall have to make seven journeys to my dealer to bring back the wireless goods my coupons will entitle me to."



The Right Weather

I suppose you have your own particular pet theory as to what kind of weather seems to suit wireless reception the best. Until recently my own theory was that my set always appeared to be at its maximum efficiency just after a violent storm of wind and rain.

So firmly fixed in my mind was this theory that I quite got into the way of asking my *knowing* wireless friends round to hear my set on wild and stormy nights. I used to look upon a number of dripping mackin-



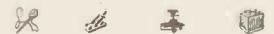
An ideal night for reception.

toshes and wet umbrellas in my hall as one of the best omens for excellent reception.

Within the last week or two, I have been compelled to revise my

weather and wireless ideas a bit. There has been a good deal of frost and fog lately and I have been getting such splendid reception from both far and near that I have come to the conclusion that frost and fog are every bit as helpful to wireless as wind and rain.

The most interesting thing about my wind and rain, frost and fog theory is that it explains to some extent why we get excellent reception during the winter months. You see, during those months, the weather practically does nothing but alternate between the two types, wind and rain, with consequently mild weather, and frost and fog with attendant hard weather.



Salesmanship

"May I borrow your pocket-knife, sir?"

The speaker was the rosy-faced, genial-looking traveller who had been seated opposite to me in the



Salesmanship.

main-line express for the last hour. I took the desired object from my pocket, opened the small blade and handed the open knife to the speaker. After looking at the small blade of the knife intently, the genial one, rather to my surprise, shut the small blade and opened the big blade, the one with the jagged edge.

Looking at me rather knowingly, my travelling companion said, "I see you are interested in wireless."

"Yes; I am," I admitted. "I suppose my knife edge gave you the clue."

"Well, yes. May I ask, sir, if you spoil your pocket scissors by cutting wire with them?"

"I am afraid I do," was my reply.

With the quickness of a conjurer, my questioner produced a queer-looking tool, from his sleeve, I think, and began to show me the several parts of the tool and to explain their functions.

"What you want, sir, is one of our pocket compound wireless tools, wire-cutter, pliers, knife——"

No, I did not buy one. If I had done so, I should still have gone on spoiling my pocket knife and scissors.

Broadcasting and War

I wonder what ex-service men thought of the report that French troops on active service in Morocco recently enjoyed the broadcast programmes from 2LO and other European broadcasting stations.

One ex-service man of my acquaintance thought it an excellent notion to have wireless receiving sets capable of picking up broadcast programmes in the trenches or on the battlefield.

"But you wouldn't catch me listening-in when there was a strafe on," he said. "No, I have doubts as to whether I should enjoy 'In a Monastery Garden' to the accompaniment of a creeping barrage. Still, I could have enjoyed a bit of good broadcasting during quiet times out in France."

The little conversation I had with my ex-service friend set me thinking of the other side of the picture. I wondered if any of us would live to hear the broadcasting of the noises of war.

I remember well the awesome effect of first hearing the distant roar of the guns in France and Belgium. What would have been the cumulative effect of broadcasting the noise of those guns to a million listeners-in in "Blighty"?

The idea is possibly too terrible to contemplate, let alone carry out. There is a lighter side to broadcasting the noises of war. I remember more than one divisional concert party whose programmes



A difficulty in broadcasting war.

would have made excellent "broadcasts," and whose efforts, if broadcast, would have brought laughter into a million homes.



Fully Licensed

Yesterday, for the first time in my wireless life, I entered a post office to purchase a wireless licence. No, I have not only just commenced wireless, neither am I a wireless "pirate."

Some of you will guess at once why I have never had to go to a post office for my annual licence before this. My original licence was an experimental one, and I have only recently come under the new

arrangement whereby there is only the one type of licence.

I expect you know all about going to the post office for a wireless licence. I didn't, and I passed my



Fully licensed.

Postmaster-General's notice and my ten-shilling note rather timidly over the counter to an austere and very official-looking clerk.

After scribbling a word or two on a pad, the clerk looked at me and loudly demanded my full name. Now there is nothing I dislike more than to be asked my full name in public. However, I mustered up all my courage and replied very deliberately:—

"My — er — full name is — er — JOHN —"

Two other clerks behind the

WOULD YOU LIKE IT AS A CHRISTMAS GIFT?

This "WIRELESS MAGAZINE" neudrodyne set (the actual set built in our construction room and described on pages 467-471 of this issue) will grace the wireless den of one of our readers this Christmas.

We promise to send it, complete with Cossor valves, to the reader from whom we receive, not later than Friday, December 18, what we consider the best reasons why we should give it to him.

Our judgment is final and there is no appeal from it.

You understand, the prize is the set designed and made by ourselves, and nothing else, and its value is Twenty Pounds.

So put on your cap of ingenuity. Write out your reasons on a sheet of paper, add your name



and address, attach the enquirer's coupon cut from page iii of the cover, and post to reach us not later than December 18.

We undertake to dispatch the set to the prize-winner not later than Tuesday, December 22, in time to reach him as not the least, we hope, of his Christmas gifts.

Address all letters to "Reason Why," THE WIRELESS MAGAZINE, La Belle Sauvage, E.C.A.

counter stopped counting stamps in order to look at me, and a lady paused in the act of passing a parcel over to be weighed. You see I am very clean-shaven and I do often wear big spectacles.

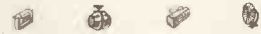
"—HENRY—"

A man looked from out the telephone booth, and an old lady dropped her purse on the floor. Although I have not the Oxford accent I speak a little Cambridge now and then.

"—Halyard."

There were faint but audible signs of disappointment, and the normal business of the post office was quickly resumed. A few minutes later and I left that post office with my new licence.

I think I shall send a wireless friend to renew my licence next year.



Better Late than Never

An old gentleman of my acquaintance has recently succumbed to wireless, and the story of his capitulation is not without its amusing side.

For a long time the old gentleman held out against the attractions of a wireless installation on the grounds that he liked to be in bed soon after 9 p.m. However, he eventually purchased a three-valve set. He fixed the set in his own little private sanctum and had a loud-speaker placed in another room for the benefit of his wife and family.

About a fortnight after the installation of the set I asked the old



Better late than never.

gentleman how he was getting on with the wireless programme.

"Splendidly," he replied. "We listen-in every afternoon and evening, but we shut down before the weather forecast and the news bulletin. You see I like to be in bed by ten o'clock."

Yesterday I saw my old friend again, and as before I asked about the wireless set.

"The set is working better than ever," he told me. "I don't know what we should do without it now. We hear very little, though, of the Savoy Bands and the other late items on the programmes. You see, I do like to be in bed by eleven o'clock at nights." HALYARD.

THE TELEGRAPHONE

A Device for "Storing" Broadcasting

THE telephone, wireless and wireless telephony — these three may justly be called milestones in the electrical era. Every week we hear of some invention, some subtle mechanism, that is to bring our means of communication one stage nearer perfection, but it is invariably in the field of wireless that these discoveries are made.

Neglected Telephone

Our homely telephone, almost as indispensable as the food we eat, has been overshadowed by its more spectacular rivals and has fallen into a sad state of neglect. No instrument is more possible of improvement in every way, and since the advent of wireless no instrument of the same importance has been more neglected.

Of late years scientists have devoted amazingly little attention to it, all their time being presumably taken up with inventions such as television and experiments with the atom that thrill the readers of the evening papers.

The Telegraphone

But this is past. A new epoch has opened in the annals of the telephone by an instrument that will shortly become as great a necessity in the home and office as its humble predecessor. I mean the "telegraphone," an instrument only recently introduced to this country but already (such are the ways of British progress) adopted by the G.P.O.

Absent though Present

An effective combination, so long desired, of the telephone and the photograph, has at last been obtained. The business man of the future will ring up his client, press a switch, and have a permanent record of his telephonic conversation that will be as binding and irrefutable as a written document.

If he wishes to leave his office locked up and empty, he can give his machine instructions (it sounds almost uncanny) to deal with all calls that may come through, knowing

that on his return he has only to replace the switch to hear all that has been said by his correspondents. (This special use of the telegraphone has not yet been authorised by the G.P.O.)

The principle of the machine is simple in the extreme. Phonetic currents from the G.P.O. telephone to the telegraphone are amplified and conducted to the recorder. This transforms the electric into mechanical vibrations, transferring them by means of a special mechanism to the cylinder.

It is this transformation of energy (which must take place without

This special article by W. Erskine Brydges describes a remarkable development by which an ordinary telephone can be made ever so much more useful; by which perfect and permanent records can be taken of any conversation, whether over the phone or otherwise; and by which morse signals, speech and music, whether broadcast or not, can be stored for broadcasting at any convenient time.

affecting the phonetic waves) that has heretofore been the chief obstacle to be tackled, and in the solving of this problem lies the whole success of the telegraphone.

Now let us look at some of its uses in ordinary everyday life.

Mr. Brown with, of course, a telegraphone installed, wishes to go out and leave his office locked up because, perhaps, of the presence of important papers. He gives his orders by speaking into the machine, puts the switch across and goes out.

To return for a moment to technical details. Since the sound-box or microphone is in parallel with the G.P.O. telephone, when a subscriber rings up the circuit is completed, the machine itself becoming a "line."

"Mr. Brown is Out"

The act of ringing up releases a catch which allows the wax cylinder (upon which Mr. Brown has recorded his voice) to revolve, announcing that Mr. John Brown is out just now, but that if the caller will leave a message he will ring him up on his return.

The caller leaves his name and telephone number, and as soon as Mr. Brown does return, by pressing a switch he is able to hear the whole of the conversation.

Such a system is of incalculable value to anyone who depends to a great extent for appointments and business deals upon his telephone. The doctor, for instance, and the lawyer—the category is endless.

Also, the conversation is preserved word for word on the wax cylinder, thus acting as a witness and making it impossible for the caller subsequently to deny any part of the conversation.

Voices Pigeon-holed

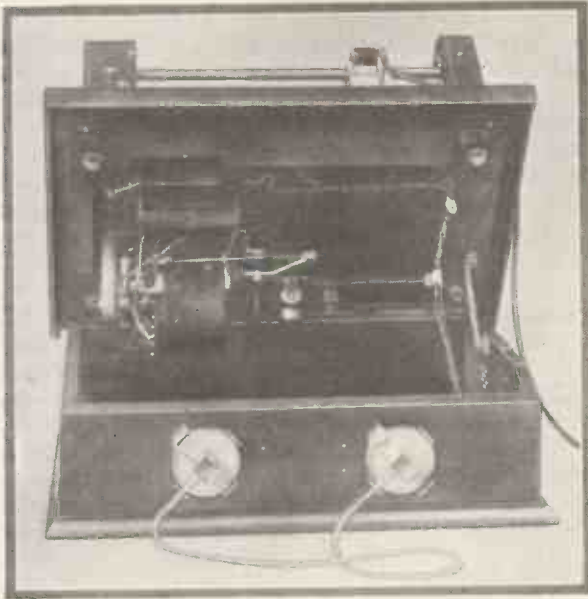
This function of mechanical witness is one of the most important played by this weirdly human machine. All talks over the phone are recorded permanently and can be docketed and pigeon-holed in the same manner as a document can be filed.

If a client denies a telephonic contract, the business man has merely to consult his index, pick out, say, cylinder B12 of August 17, put it on the telegraphone as one would put a record on a gramophone, and hear the whole deal over again.

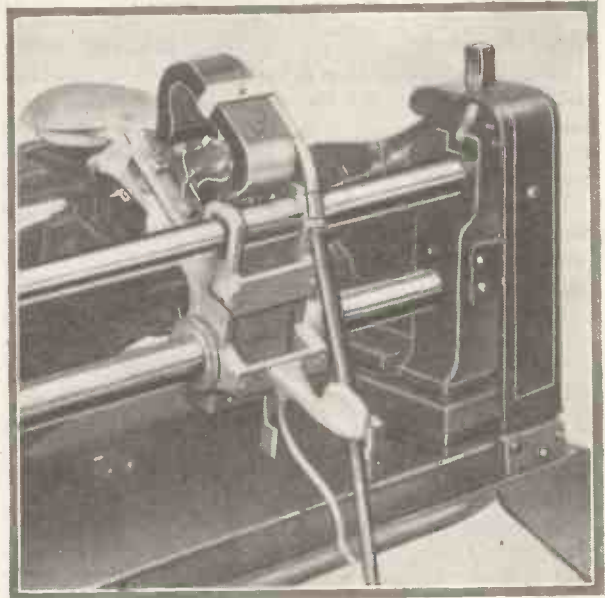
The client's words are there, clear and definite, in the client's own voice, so he is actually condemned, so to speak, out of his own mouth.

Owing to this factor, which makes all telephonic business transactions binding and irrefutable, in cases of deals at short notice no written confirmation of the order is necessary. For instance, orders given to brokers need not be repeated, and so cables and telegrams are saved to an enormous extent.

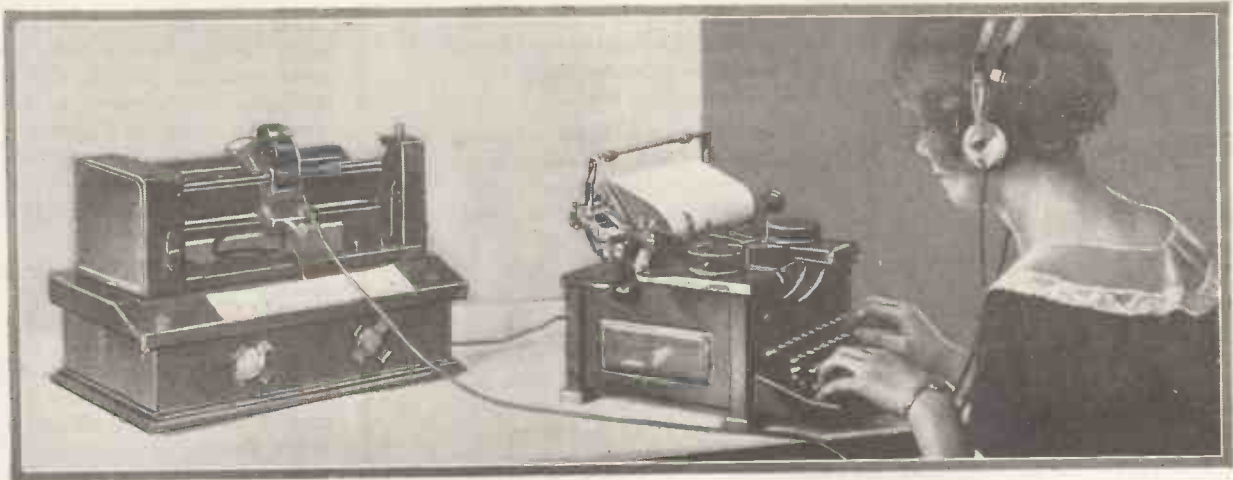
Exclusive Telegraphone Photographs



Underneath view of Telegraphone, showing driving motor.



Detailed view of Telegraphone mechanism.



Typist taking down message (dictated, land-line or wireless) at leisure or at any speed she wishes.



The Telegraphone ready for use.



Amplifier for use with the Telegraphone.

THE TELEGRAPHONE (Continued)

Legal Evidence

Since the cylinder once recorded is absolutely unalterable, the voice of the telegraphone is—and, indeed, in the German courts, has been—accepted as legal evidence.

Technically speaking, of course, it cannot be regarded as documentary evidence; but it is placed in the category of "exhibits" from which the jury may form an opinion not only by sight but also by their other senses.

Of course, the machine can also be used to record voices talking in one room, and therefore is almost indispensable at important conferences; for every conversation or discussion is afterwards available for reference, thus saving endless arguments and difficulties. If any point arises, the record is taken from its box, put on, and the whole meeting takes place over again.

Various uses of the telegraphone are illustrated by the drawing opposite, which is reproduced by permission of *The Graphic*.

Saving Your Valves

And now for the uses of the telegraphone in the field of wireless. For all telephonic installations it will soon be a definite necessity, and the time is not far ahead when every wireless enthusiast will have one beside his receiving set.

For instance, if 2 L O is broadcasting upon a subject which holds not the very slightest interest for you, you would switch off your valves and wait until you think the speech had finished. However, there is the chance that you might misjudge the time, not once but several times, and after a while this becomes annoying.

Preventing Disappointment

Also, it is if anything even more provoking to switch on after Madame Melba's song—which you particularly wanted to hear—has been going for several minutes. All this is eliminated by the telegraphone.

By connecting your headphone or loud-speaker leads in parallel when 2 L O fades out and in again, the

machine will operate and warn you to switch on through the loud-speaker.

Thus you can all the time remain comfortably in your arm chair and hear only those items in the programme that you have previously chosen.

Wireless Encores

Another, and perhaps even greater advantage, is the fact that you can make records of any speech or song that pleases you without in any way interfering with your reception of

however, is that a resistance inside the instrument will serve as an amplifier if the reception of broadcasting or a long-distance phone call is at all weak.

To turn to the purely frivolous—the instrument will make perfect records of the voice of anyone speaking into the microphone, so it is possible to send verbal letters to anyone who also owns a telegraphone.

Your friend will receive a cardboard box instead of the usual envelope, and the letter will be an unpromising-looking black cylinder.

However, as soon as this is put on the machine instead of reading written words he will be listening to a discourse in your own voice.

Replying by Record!

As soon as he hears you say, "Well, good-bye, old chap, I must push off now," or some such ending, he will take off your cylinder, put on one of his own and proceed to tell you his reply. Obviously a boon to those who, although fluent talkers, have not the gift of recording their thoughts in readable English!

In such cases it entirely obviates the necessity for employing a shorthand typist, for business men will find that they are able to answer letters verbally without the least necessity for having their words taken down.

It may safely be said that the telegraphone represents one of the biggest strides we have yet made in the art of communication. It can, of course, be tuned-in to receive wireless telephony, which it will do with just the same efficiency as it receives and records messages over the ordinary G.P.O. phone.

In the Near Future

In fact, when all is said and done there are very few things that this remarkable machine will not do, and in a very few months it will be as much part of our lives as our old friend the telephone. One more curse, say the pessimists!

Yes, but also one more stride along the uphill road of human progress. W. ERSKINE BRYDGES.

NOISY WIRELESS.

A scientist has proved it possible to receive by wireless the noise made by an electron in motion.

SCIENTISTS now have a notion
That electrons, when in motion,
Make a noise—p'raps like a lion
With his north-west weather eye on
Something tasty for his breakfast
(Shall he sample Capt. Eck, first?).

P'raps the electron's voice is human—
Holding forth with great acumen—
P'raps it has a raucous yodel
Blowing teeth out of its noddle.
P'raps it dull-emits a squeak
As it dribbles through the "leak."

Is it, think you, prone to bleating?
Would it die if sprayed with Keating?
Does it creak like Anna's slipper?
Can it bark like Monday's kipper?
No! I feel—forgive my scowling—
'Tis the cause of all the howling!

CEE TEE.

the item through the phones or loud-speaker in the ordinary way.

By placing the loud-speaker in circuit with the telegraphone microphone you can obtain a perfect record of your favourite song or orchestral selection, which can be played on the machine as on a gramophone, only with considerably better results.

To do this you switch off your valves and leave the telegraphone in circuit with your phones or loud-speaker. Obviously with such a machine at one's command the possibilities for entertainment and amusement are endless.

One very practical advantage,

The Telegraphone Can be Used for Many Purposes

HOW THE CONVERSATION OF ANY OFFICIAL MAY BE RECORDED BY A CENTRAL INSTRUMENT.

Central Telegraphone Instrument. Operator. Private telephone exchange. Conversation not being recorded. Important conversation being recorded by Telegraphone.

THE TELEGRAPHONE INSTRUMENT.

Boxes containing amplifying valves, relays, etc. Control tray. Record. Accumulators. Slide bars. Hinged side to facilitate removal of record. Paper. Pointer moves along strip of paper on which is marked the beginning and the close of each conversation and with whom it has been had. Warning bell, which rings when cylinder is nearly full. Cylinder Full.

USING THE MACHINE FOR RECORDING IMPORTANT TELEPHONE MESSAGES.

After use the cylinder is packed in a padded box with the wires maintaining a record of conversation that is engraved upon its surface. Padded box. Ordinary tele. attached to Telegraphone.

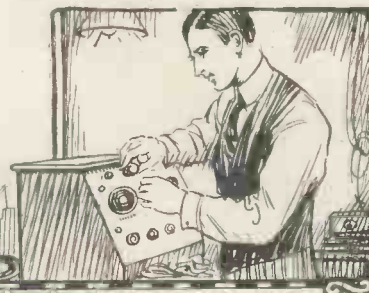
FOR USE IN HOTELS.

Typist & Telegraphone. Box containing small electric motor or driving recording cylinder. Using the Telegraphone for dictating letters this machine is able to serve more than one office. Telephone messages in obscure languages can be received for a foreign visitor if he is not in the hotel and correctly repeated on his return.

FOR WAR WORK

Taking a record of enemy wireless messages for examination and decoding.

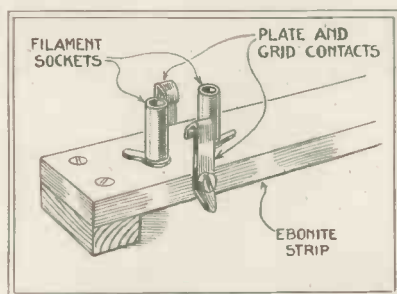
Gadgets, Hints and Tips



Anti-capacity Valve Holder

WITH a view to producing an anti-capacity valve holder the writer mounts his valves along a strip of ebonite as shown.

Holes are drilled accurately for



Anti-capacity Valve Holder.

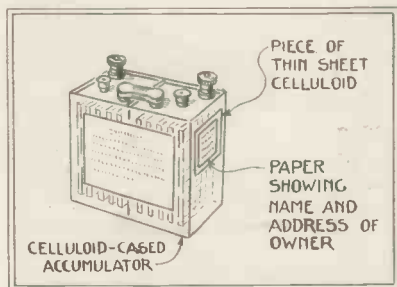
the filament connections and equipped with the usual valve legs—this supports the valve.

Grid and plate connections are then made from springy brass strips suitably bent and screwed into position.

F. R. N.

Identifying the Accumulator

ACCUMULATOR-CHARGING stations now have so many accumulators to deal with—several of which may be



Method of Labelling Accumulators.

of identical make and size—that some permanent method of marking one's property is almost essential.

A piece of thin sheet celluloid is obtained, together with a small quantity of celluloid cement (amyl acetate); a strip of white paper on

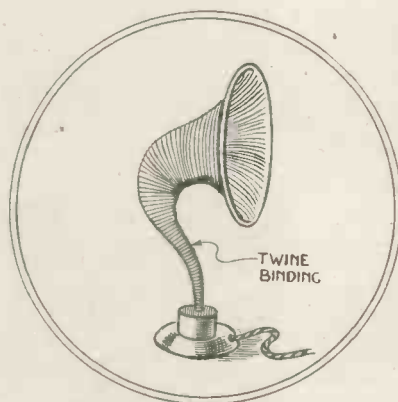
which the owner's name and address is written or neatly printed is then placed underneath the thin sheet of celluloid and the latter is cemented to one of the sides of the accumulator.

I. M. R.

Improving the Loud-speaker

A CHEAP loud-speaker that is "tinny" can be improved in tone by binding a quantity of thin twine (very tightly and closely) round the horn from the bottom to the flare, giving this a thin coat of shellac to keep it fixed permanently.

The winding is simple and straightforward except at the bend of the horn, when the underside has to be



Loud-speaker Bound with Twine.

overlaid for a number of turns to keep the top (or longer) surface closely covered with the single layer of twine.

W. R.

Protecting the Crystal

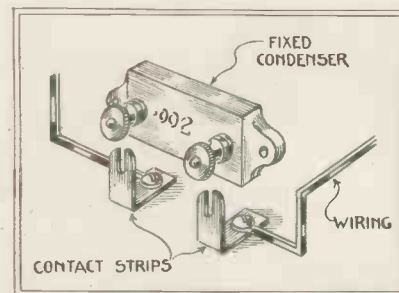
CRYSTALS can be protected from dust by placing a piece of muslin over the cup. If the muslin is stretched tight it will be found that a sharp-pointed catwhisker will penetrate easily.

The material can therefore be kept permanently in position without any detrimental effect with regard to the efficiency of the detector results.

A. C.

Mounting Fixed Condensers

IN experimenting with new circuits it is often necessary to try the effect of altering the value of a "fixed" condenser. Usually this is rather a fidgeting operation, as the terminal



Brackets for Mounting Condensers.

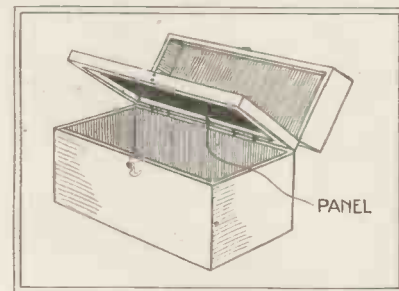
nuts on most condensers are so small.

By arranging the slotted brackets (as shown by the diagram) on the panel, however, a great deal of trouble is obviated.

A. D. B.

Accessible Cabinet

SHOWN by the diagram is an accessible form of cabinet that is of special convenience to experimenters. It is made in three parts, the idea being so to mount the panel that the under-



Accessible Cabinet.

neath connections can be easily examined.

The frame should be made of 1-in. square wood rebated to take the panel. Both frame and lid are made to the outside size of the box part.

H. E. M.

The B.B.C. Christmas Greeting

A Personal Message from Mr. J. C. W. Reith, Managing Director

"I am very glad to have this opportunity of wishing, on behalf of the B.B.C., 'A Happy Christmas' to all readers of THE WIRELESS MAGAZINE."

IN the development of a great broadcasting service, the only monotony is that of change. Nearly every week presents new problems the solution of which requires continuous adaptation and extension. And yet it is of the highest importance that principles should not be sacrificed to expediency.

We believe that we started on the right lines and that, in this respect and as far as organisation is concerned, we are considerably in advance of the systems of other countries.

If the British system is to retain and perhaps increase its present ascendancy, then the first essential is the preservation of its characteristic ideals, standards, and organisation.

The most notable event of the past year was the opening of our permanent high-power transmitting station at Daventry, whence it now serves the whole country on valve sets and nearly 23,000,000 people on crystal sets. Just over 90 per cent. of the population of England, Scotland, Wales and Northern Ireland, have been brought within crystal range of one of our programmes.

About 60 per cent. are within crystal range of at least two stations.

But we are profoundly dissatisfied with the absence of more adequate alternative programmes.

The past twelve months have been the beginning of the international era. We were glad to take a prominent

part in the formation of the International Union of Broadcasters which is now zealously tackling the difficult problem of wavelength adjustment

The "Round the Continent" programmes we have taken so far have encouraged us to develop this side of our work.

Our desire to provide more alternative programmes to listeners and to play our part in the international plan will involve important new schemes of development during the coming year. It is possible that in the general interest some of our low-power stations will be sacrificed, but we have definitely undertaken not to do away with any station before we have provided and tested to our satisfaction at least equivalent facilities.

Taking the problem of alternative services in conjunction with that of the international wavelength position, it may be found advantageous to modify the system considerably. Present indications are that such a change would not only benefit listeners greatly, but would bring in those limited areas which are still outside crystal reach of our stations.

And so we hope to go forward, steadily improving our service. Both on the technical and programme sides broadcasting is a new art-form. It has established its right to a per-

manent place in the machinery of our civilization.

As long as we are entrusted with the stewardship of the British service our first concern will be to see that it continues to combine entertainment with the education and ethics that produce good citizenship.

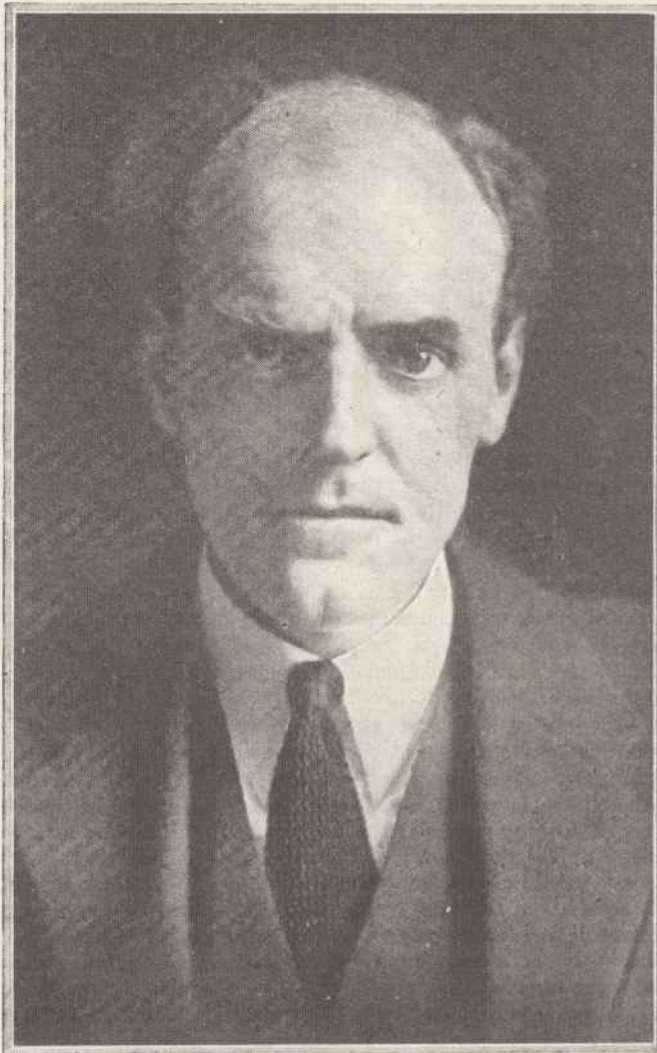


Photo by Olve Edis.

Mr. J. C. W. Reith, Managing Director of the B.B.C.

among the 110 stations that claim places in Europe's ether.

The experiments in relaying and rebroadcasting speeches from the League of Nations Assembly at Geneva were significant of the early possibility of extending a statesman's audience to include half the world.



Climax multi-gap lightning arrester



Dust-proof Economic Electric detector



The Polar-Four has distant control



Lotus three-way coil holder

Set made with Polar Blocs



M-L low-frequency transformer



Useful Clix connector



Ellis fool-proof valve holder



Dubilier-Mansbridge fixed condenser



Rapinet basket-coil holder



Eureka low-frequency transformer



Complete Fluxite soldering outfit



Give Them Radio

BROADCASTING has brought with it many boons and blessings, and not the least of its benefits is that it has solved the problem of Christmas presents. No longer is it a case of what will young Billy like? What on earth can I give Tom, who is showing the first signs of a moustache? And as for Dick's wife, goodness only knows what she would like.

One word will answer all such questions—Radio!

It is, of course, quite as easy to give radio presents that will disappoint as it is to give any other type of present which is unsuitable, and for that reason the suggestions that are put forward have been carefully considered so as to satisfy the widest possible divergency of tastes.

Apart from the question of cost, there are two sharp divisions to be made. First, there is the present to someone who already possesses a wireless set, and secondly, the present to the man or woman who is not yet a listener-in.

Let us consider the first class. Every present must obviously be in the nature of an accessory, something that will add to the attractions of an existing receiver and not necessitate any radical re-arrangement. For instance, for the owner of the modest crystal set the man with a moderate pocket headphone distributor boards which facilitate the connection of a number of headphones to the same instrument.

Headphones themselves are always welcome to the owner of the crystal or small valve receiver designed only for headphone reception.

One does not hear much these days of the "handphone," which is a single earpiece mounted on a long handle. These are often very acceptable to ladies whose hair may be disarranged by the bands of the standard type of headphones.

Try to remember the details of your friends' wireless sets. Have they facilities for receiving the high-power station at Daventry? If not, what about a 5 X X loading coil?

The younger folk are easier still. Perhaps there is a nephew who is an ardent home constructor and who is waiting to save enough money to purchase

a special type of valve to complete that amplifier which is to be added to the family's crystal set. A certain component may be missing—a transformer, a set of coils, or a variable condenser. High-tension batteries are always running down and may be the cause of the family's missing the special Christmas Day programme.

One of your friends may have a son whose wireless enthusiasm outruns his memory of the stern parental injunction, "You're not to touch the wireless." Give him one of those key switches with which a set can be locked up, safe from interference of any sort.

Another interesting present, especially to the boy constructor, would be a soldering outfit which dispenses with the usual soldering bit, and substitutes a special outfit heated from the ordinary accumulator.

Progressing a little further, one should remember that many folk are interested in some of the new high-tension eliminators which have recently appeared.

Broadcasting has solved the problem of Christmas presents. But it is as easy to buy the wrong wireless present as it is to obtain any other unsuitable present, unless you give some thought to the matter before spending your money.



Ornamental
Beco
loud-
speaker



G.E.C.
low-
loss
condenser



Puravox
loud-
speaker



Philips
battery
charger

This Christmas!

Again, there is a wide choice amongst "baby" loud-speakers, and gramophone attachments should not be forgotten. These will certainly be acceptable where a good gramophone already exists, and will give excellent results with a moderately-powered receiver, such as an ordinary two-valver.

The young constructor may be delighted with a special dull-emitter type power valve or a high-class transformer.

Many of the foregoing articles cost less than ten shillings and none of them over £2.

For the man whose purse is a little longer a "standard" loud-speaker or a cabinet model may settle the Christmas-present problem.

Mention of the word cabinet reminds one that many homes contain wireless sets in the sense that an instrument, which is obviously an "instrument," together with a mass of wires, just "exists," and in that home a neat cabinet to house the whole installation would be acceptable. Cabinets can be obtained to house almost any type of receiver.

If one's purchases are carefully made a set of parts to construct a complete two-valve receiver may be obtained for the sum of £4.

For an extra pound one may obtain a very fine type of hornless loud-speaker or, alternatively, a horn type with a handsome polished oak flare which will not fail to please; whilst those who do not mind spending from £10 to £15 on a present may obtain all the essential parts for a seven- or eight-valve supersonic-heterodyne receiver.

We have not yet considered the case of the present to the novice—the man who has no wireless set. What can he be given?

Well, first of all there is the obvious crystal set, that can be obtained in a hundred-and-one different types. The one-valve set is not so popular, for the results obtained are not so very much better than those from a crystal receiver as to justify the extra upkeep. Practically speaking, the next step is the two-valve set.

Take care to ascertain whether the person to whom you will present the set is near enough to a broadcasting station to obtain loud-speaker reception from a two-valve receiver. If he or she is, then get a set with one stage of low-frequency amplification; whereas if the distance is too great a two-valve receiver with a high-frequency stage is obviously indicated.

When choosing complete receivers one should remember that there are two distinct kinds, the set which is really "complete"—that is, the set in an ornate cabinet to which any addition is impractical—and the "elastic" unit set.

The golden rules to remember when choosing a radio Christmas present are:

If the recipient is a boy or a man interested in "construction," do not give a "furniture" set, as it will in all probability be pulled to pieces. Give components, a complete "kit," or one of the "elastic" construction outfits.

If the recipient is a lady, give something with an attractive outward appearance.

Lastly, do not give anything that means the "scraping" of existing apparatus.

In this article Mr. F. H. Robinson, the editor of a well-known wireless trade paper, gives advice to those readers of THE WIRELESS MAGAZINE who are thinking of giving their friends and relations wireless presents this Christmas.



Paramount
permanent
crystal detector



Gecophone
super-capacity
H. T. battery



Belling-Lee
engraved
terminal



New Brown
cabinet
loud-speaker

Unit of
Cosmos
Radiobrix



Marconi-
phone
phone
distributor

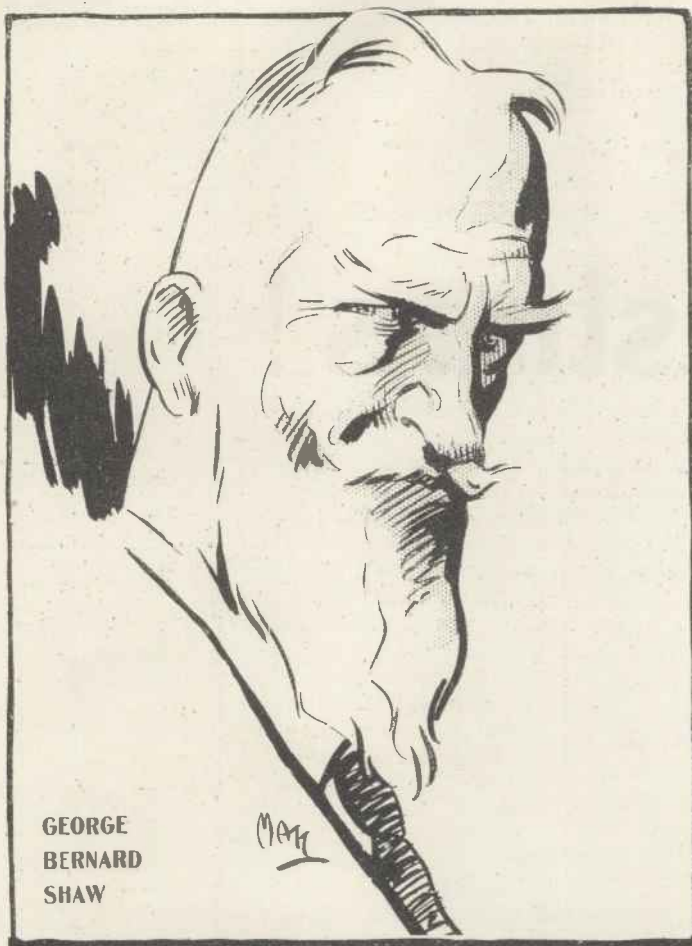


Sterling
handphone
for the
ladies



R.I.
cabinet
four-
valver





GEORGE
BERNARD
SHAW

The UNSEEN DRAMA

In these pages some of the best-known personalities in the dramatic world, including

George Bernard Shaw,
Horace Annesley Vachell,
Sir Frank R. Benson,
Jerome K. Jerome,
Eden Phillpotts,
Arnold Bennett,
W. L. George,
Noel Coward,
Sutton Vane &
Owen Nares

answer the question—one that concerns all readers of "The Wireless Magazine"—

IS THE WIRELESS PLAY POSSIBLE?

The answers have been garnered by Pearkes Withers. The caricatures are by Matt.

CONCERNING many wireless matters opinions are not merely divided, they are exceedingly diverse; but concerning the transmission of ordinary stage plays opinion seems to be pretty general that the result is unsatisfactory.

Shaw's Success

True, Mr. George Bernard Shaw once gave from 2 L O a reading of his play, *O'Flaherty, V.C.*, with considerable success, but a reading cannot be regarded in the same light as a stage performance; indeed, an author's reading of a play may surely be said to bear little more relationship to its ordinary presentation than the reading of a set of verses bears to the singing of a song.

Musical comedies, operas and revues (pardon me, oh ye Highbrows, for mentioning these three in one breath, so to speak!), are all capable of being flung into the ether and picked up by crystals and valves without-utterly losing their entertainment value; but ordinary—and even extraordinary—stage plays

consisting of dialogue and action (or "business") become almost unintelligible to the unseeing listener.

And the B.B.C so fully appreciate this lamentable result of wireless limitations that they are endeavouring to develop "wireless plays"—plays specially contrived for enactment in the studio and reception in the home.

The B.B.C. contend that there is no reason why plays written expressly for the new medium shall not eventually achieve a new and distinct art-form, and they have tried several different types of "radio drama" in the course of the last eighteen months in a laudable endeavour to find this new art-form.

I do not think, however, that even the most enthusiastic of wireless "fans" can pretend for a moment that any really distinctive art-form has yet been achieved. I do not think that the B.B.C. would contend for a moment that it has been achieved. I do not think that even those writers who have devised plays

for wireless purposes would maintain that it has been achieved.

There have been a number of interesting experiments, but at present both the B.B.C. and the would-be wireless dramatists are groping—striving after that elusive new art-form which they all hope one day to introduce (in all its beauty) to our ears.

Attainable Ideal

The question is: are they striving after a really attainable ideal, or pursuing a mere will-o'-the-wisp?

Can any fresh type of play emerge from all this endeavour that shall prove completely satisfying to all our senses without embracing the sense of vision?

Can unseen characters live successfully a story unfolded to people who (so to speak) are in the dark?

Can a playwright ever devise such a piece of dramatic work as shall completely hold an audience with interest, entertainment, even enthrallment, through the sense of

EXCLUSIVE TO "THE WIRELESS MAGAZINE"

hearing alone—and that sense entirely divorced from the theatre?

For my own part, I try to preserve an open mind on the question, though sometimes I wonder whether so much concentrated effort is really worth while, since television may quite possibly become an accomplished fact long before the perfect "radio drama" is written.

But the question is one that concerns more than a million pairs of human ears and is, therefore, plainly a matter for discussion.

Hence, with the Editor's complicity, I have sought and obtained the views of a number of famous dramatists and actors, and of a number of writers of "wireless plays" on this very vexed question; and I have also persuaded Mr. R. E. Jeffrey, dramatic producer to the B.B.C., to contribute a statement of the official viewpoint.

I do not, of course, suggest that this symposium is as exhaustive as it might be if it filled a book instead of a few pages of THE WIRELESS MAGAZINE, but at least it is fairly representative.

George Bernard Shaw

All the attempts to broadcast plays to which I have tried to listen have been unbearable.

Certain plays are effective when read by a single person who knows his business. But it is not an actor's business, though some actors can do it. Such readings can be broadcast like any other reading.

Sutton Vane

I see no reason whatever why the "wireless play" should not be developed into a separate and distinct form of dramatic art. But it *must* be separate and it must be distinct, and therefore it must be developed not along lines parallel to the dramatic art with which we are all familiar on the stage, but away from it.

After all, the art of the cinema—if it is an art—presents comedy and drama to the eyes alone, and surely the human voice must always have a more intimate appeal than any pictures in the telling of a story. In fact, so instinctively do we recognise the importance of our ears that we always call it the "telling" of a

story, whether the story be told by word of mouth, on a screen, or on a printed page.

I do not fancy, however, that the ideal "radio drama" will be written by a dramatist who is accustomed to the vehicle of the stage. For here is an entirely new and different art which demands an almost entirely new and certainly a very different training; hence a completely new school is plainly indicated, and the B.B.C. would do well to found such a school, and to encourage new writers—untrammelled by the traditions and conditions of the stage—to study in it.

When television becomes an accomplished fact and is associated with wireless plays, it will not much matter, I imagine, how many characters figure in a story. But meanwhile, it seems to me that the characters should be very few in number, to avoid possible confusion in the mind of the listener, and that most of the dialogue should really consist of duologue.

L. du Garde Peach ("L. du G.")

(Author of *Light and Shade*, *Wavelength*, *Stung*, and other plays for the B.B.C.)

I consider that there is no doubt that wireless plays will become in time a definite and distinct art-form, as have plays written for the cinematographic screen. Indeed, wireless and the cinema stand for two halves of the whole, which is the theatre; in wireless plays the characters are heard and not seen, and in the cinema the characters are seen and not heard.

All successful plays are written with a view to the actual particular stage upon which they are to be

played. It is obvious, therefore, that most—nearly all—plays written for the ordinary stage will be unsatisfactory when transmitted by wireless, because they depend equally upon things heard and things seen.

But plays can be written which do not depend upon vision, provided that the dramatist bears in mind an audience which is listening only, and realises that his atmosphere must be conveyed by sounds. External and easily recognisable sounds must be made to take the place of the scenic suggestion of the theatre.

Wireless plays demand a special technique, different from that of the parent theatre. As yet we are only feeling our way, but the technique is bound to come.



HORACE
ANNESLEY
VACHELL

Owen Nares

What a question?!*..

An affirmative possibility would mean starvation for the likes of me. Luckily (in my opinion) wireless

THE UNSEEN DRAMA (continued)



NOEL
COWARD

plays and synchronised voice and picture plays are hopeless!

Noel Coward

does not consider "wireless plays" a good idea, any more than he thinks it would be a good idea to have recitations on the cinematograph.

Ashton Pearse

(Author of the Wireless Play, *A Month Come Sunday*.)

Are wireless plays possible, and do I consider that any type of play can prove really satisfactory that does not embrace vision? I would say, unhesitatingly, yes!

First, to consider the limitations. There cannot be the range of theme possible to the theatre, because for one thing, sex, with its many facets and complications is not suitable for general broadcast. Then again, plays of complicated stage action and "business," with many characters in the scene at one time, are not suitable, as the listener becomes confused as to who's who and what's what.

But a play of strong interest, whether dramatic or comic, if well constructed and cumulative in effect,

with few characters, and most of the dialogue in duologue, will come through to the listener with every success.

As the cinema has its "captions," so the imagination of the listener should, I think, be aided by descriptive touches, embodied in the dialogue of the scene in which the action takes place and the personal characteristics of the characters. Similarly, when a new character comes into the scene, the entrance of that character should be pointed for the listener by a line or two in the dialogue. Characterisation should also be very marked, and the performers should have voices of clearly defined and different qualities.

There is a technique to be learned by the would-be writer of "radio drama," as there is a special technique to be learned by the actor therein.

Emphatically I think that the wireless play, at present in its infancy, should be encouraged to grow up and develop, as being likely to stimulate the imagination and train the eye of the mind of the listener.

Horace Annesley Vachel

(The well-known popular novelist.)

I do think that a play could be written which would interest enormously people who could only hear it. The dramatist who attempts this difficult task must reverse the ordinary rules that more or less govern the writing of plays. He must submit, in dramatic form, a fine story, full of strong characterisation. He need not worry with stage business—so difficult to present freshly—he can concentrate

on continuity of scene and situation.

Action must be indicated by the effect of heredity, environment, and circumstance upon the protagonists.

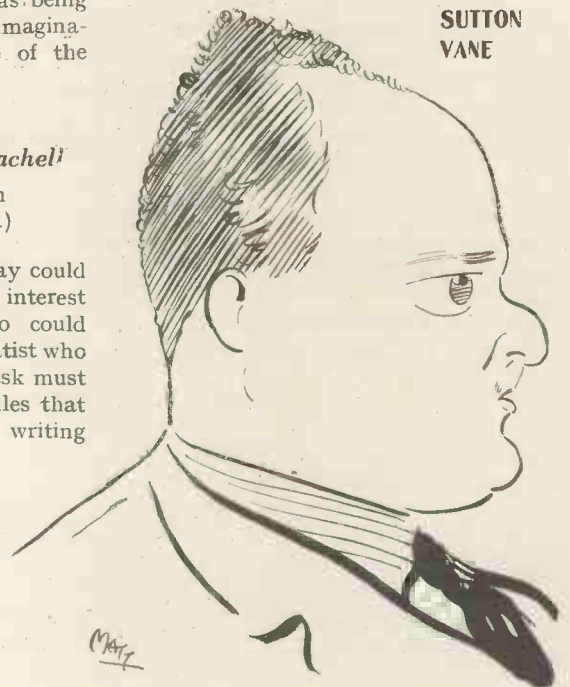
I don't know—I should like to know—what sort of return a playwright might reasonably expect if he accomplished so exacting a job.

Laurence Housman

I have heard of blind people being held by a play; therefore sight is not essential in all cases; but to get the dramatic thrill I believe they must be in an auditorium of thrilled people. It is in the lack of this that wireless is so hopeless dramatically. The audience helps to make the play—magnetically.

In wireless there is no magnetism, and for myself I find it an utter failure with speeches, music, and everything.

Wireless has really come as another blow to the development of a sane artistic sense in the great public; and from the dramatic point of view I believe it to be an utterly bad substitute—fatuous and enervating.



SUTTON
VANE

DISCUSSED BY THE LEADING DRAMATISTS

Norman McKinnel

I am afraid my views are not of much value, as I have never heard a play by wireless, and can therefore only imagine its probable deficiencies.

Obviously, however, as practically all plays are written to be seen as well as heard, such deficiencies must exist.

How to supply them, or at least to discount them, seems to me a case for experiment rather than theorising.

It would be interesting, for instance, to discover what sort of plays (if any) appeal to a blind audience; what suggestions blind people have to make as regards alterations or additions to a play, or the method of its presentation or delivery with a view to increasing its appeal to those who are deprived of sight.

Further, a series of wireless plays

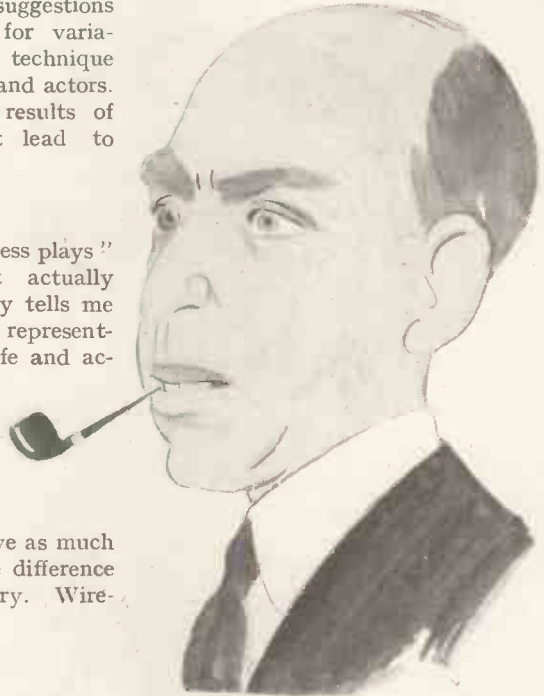
over," and to make any suggestions they thought necessary for variation or improvement in technique on the part of the author and actors.

A comparison of the results of the two inquiries might lead to valuable conclusions.

H. E. Maltby

I cannot see how "wireless plays" can be possible. What actually is a play? My dictionary tells me that it is "A composition representing a picture of human life and accommodated to action." That, I think, is a splendid definition. Now then, how can we get that composition on the wireless?

A play appeals to the eye as much as to the ear, that is the difference between a play and a story. Wire-



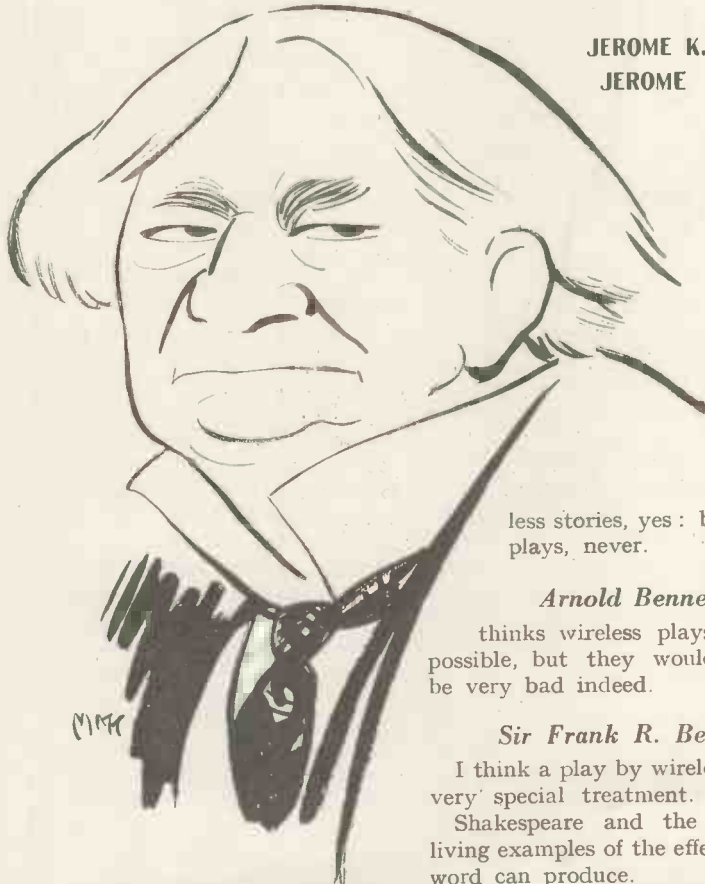
W. L. GEORGE

I see no reason why to a certain extent the wireless on the house-top should not fulfil the function of the bard on the mountain.

Henry A. Hering

(Author of the Wireless Play, *Hunt the Tiger*.)

Certainly wireless plays are possible, but they have their limitations. The action must be indicated in the dialogue as much as possible, and the characters must be well differentiated. I won the B.B.C. Play Competition with a one-act play, *Hunt the Tiger*, which was not written for wireless production, but it happened to conform to radio rules. There were only three characters, and one of them a woman. One of the others was an impetuous youth, the other an older man with marked characteristics. It was impossible to confuse their identities. The only alteration suggested by the dramatic producer before the play was broadcast was to break the length of some of the dialogue in order to avoid monotony. It was undoubtedly improved thereby, not only for broadcasting, but was made more effective for the stage.



JEROME K. JEROME

less stories, yes: but wireless plays, never.

Arnold Bennett

thinks wireless plays might be possible, but they would probably be very bad indeed.

Sir Frank R. Benson

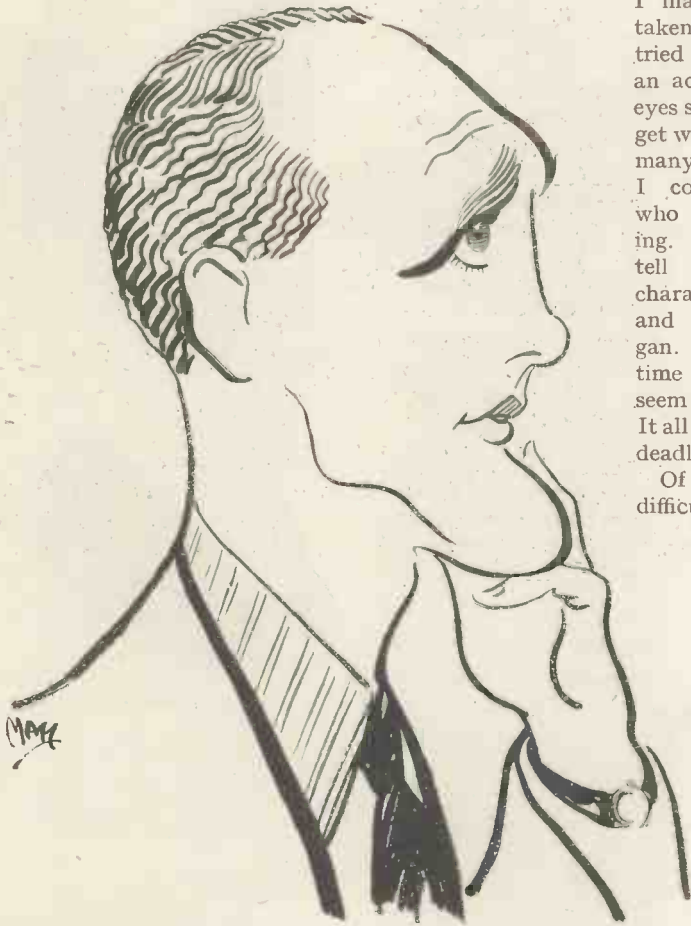
I think a play by wireless requires very special treatment.

Shakespeare and the Bible are living examples of the effect that the word can produce.

It is quite obvious that a play by the cinema, by the gramophone, or by wireless must differ in its method of production and effect from one produced by the human agent.

might be submitted to an audience of experts (say critics, actors and producers) who would be asked to state their views as to why a play did or did not—as it were—"get

WELL-KNOWN DRAMATISTS ANSWER THE QUESTION



OWEN
NARES

Quite a number of one-act wireless plays should be possible, but it would be difficult indeed to write a three-act play with its many characters, and without any help from the pauses, by-play, facial expression and gestures which are so important on the stage. But difficulties are made to be overcome.

As to whether any type of play can prove really satisfactory that does not include vision, it all depends on what you mean by "really satisfactory."

The stage play will hold its own. Headphones and loud-speakers cannot supplant it, but the wireless play, despite its limitations, will bring interest and amusement to millions.

Jerome K. Jerome

The best way of solving the problem would be to take half-a-dozen blind men a round of the London theatres. My own impression is that they would be bored to tears. But

I may be mistaken. I once tried sitting out an act with my eyes shut. I forgot why. It was many years ago. I couldn't tell who was speaking. I couldn't tell when one character left off and another began. After a time it did not seem to matter. It all seemed very deadly.

Of course this difficulty might

be got over by engaging actors and actresses purely for their voice. The heroine might always have a high-pitched girlish voice. The hero talk in an Oxford voice. The villain have a voice coming out of his boots, as the saying is. And the comic man have no roof to his mouth; and so on. No doubt it could be done. The question is whether it is worth while—whether it would not be simpler for people who want to see a play, and are not blind, to put on their hats and go to the theatre. But then I am out of sympathy with machine-made art. At the cinema I never can tell the husband from the lover until they begin to shoot. They look so exactly alike in evening dress. And now that virtuous women have taken to smoking there is no telling them from vamps.

On the whole I am not an authority on the subject. I don't seem to care, so long as I am not obliged to listen to them.

Henry Oscar

Having broadcast plays from every station in England and studied carefully the results and developments of this feature of the radio programmes, I am convinced that wireless plays are not only possible, but inevitable.

Wireless plays demand an entirely new technique. Hitherto the plays have been largely founded on the stage model. This was inevitable in the early stages because the word "play" has been inseparable from "stage." But the wireless play is a thing apart from the theatre. It depends for its effect entirely on the voice. The stage assets—scenery, personality, gesture, movement, colour, etc.—are denied the wireless author. His scenery is "sound," and all the varied arts of the actor have to be expressed by the voice. When the new technique is mastered a new form of drama will evolve.

Dramatically it is easier to write for the wireless than comically. Dramas "get over" easier than comedies because serious emotions are expressed by more standardised and conventional methods than humorous emotions.

It is not necessary to see a play to enjoy and understand it. Modern stage plays are written with an appeal to the sight sense. But the wireless play will be prepared for an absence of this sense, and will give added appeal to the hearing sense. All art conforms to necessity. Because people can see, authors give them something to look at. Radio authors will concentrate more and more on charming the ear. The elementary emotions are felt always, and sight, touch and hearing are secondary. Wireless audiences can be thrilled and excited by the right type of play as much as theatre audiences.

W. L. George

It seems to me impossible to play the ordinary drama by wireless. There seem to be only two solutions. One is to combine wireless with the cinema, so as to get sight as well as hearing. The other, which is probably better, is to write wireless plays for a very small number of characters, two or three, who never leave the scene. The cinema is all movement; the wireless allows of no

IS THE WIRELESS PLAY POSSIBLE?

movement; that seems to sum up the matter.

Eden Phillpotts

Possibly as a means of advertisement a play might be useful in connection with wireless. One cannot see that it could have any other value. With "pictures" we see and do not hear; with wireless we hear and do not see. No doubt the two marvels will some day be combined in a new art, which one feels glad to miss.

Reginald Berkeley

(Author of the Wireless Play, *The Dweller in the Darkness*.)

Of course a form of wireless drama will develop. Anyone who believes the contrary is the victim of a defective imagination.

Why should not a play be "satisfactory" that, in your phrase, "does not embrace vision"? The drama

of the stage appeals primarily to two senses—sight and hearing. The films prove the extent to which drama can go without making any call upon the sense of hearing. And precisely similar possibilities exist without engaging the sight.

Imagine yourself to be sitting by the fire. Voices are heard—argument. Crescendo. A woman chimes in. The sound of a blow. A horrified scream. The woman's voice, raving: "You've killed my husband. Devil! Murderer!" Must you have cardboard scenery, grease-paint, electric-light and a stage dagger in the dead man's shirt-front to know the kind of thing that has happened?

Yes. I have very definite ideas as to the lines upon which this new art-form will probably develop.

Remember this. The limitations of stage-drama are purely artificial—dictated by the limitations of the stage. Screen-drama has overleapt a number of these barriers. Radio-drama will overleap others. Neither will take the place of the stage, or indeed affect the stage, which is a definite and extremely beautiful art-form. But both will give increasing opportunity to the dramatist to follow his craft—which, as I understand it, is to paint upon whatever medium may be most suitable to his subject the never-failing unexpectedness of human life.

May Edginton

(The well-known writer)

In my opinion wireless plays are technically possible—with certain specifications—but whether they are yet financially possible I do not know.

For instance, a written play, expressed entirely in quick, tense dialogue, would hold the attention; but it would mean using a good, fast-moving plot and arresting situation, such as might be worked up for a stage play.



SIR
FRANK
BENSON

Therefore, what of the financial aspect?

Also, the cast must be *very* small—so that the listeners would not be confused, and the characters well defined and introduced in the dialogue.

If these difficulties can be got over, I see no insurmountable obstacle to the wireless play.

Richard Hughes

(Who has written a number of plays for broadcasting.)

Do I consider wireless plays can be developed into a new art-form? Well, in the first place I would rather they were not called "wireless plays." The important thing about them is not that they are transmitted by wireless, but that they are designed for the sense of hearing alone; they might almost as well be transmitted by gramophone records,



EDEN
PHILLPOTTS

THE UNSEEN DRAMA (continued)

for instance. Some such title as "listening-plays" might be more satisfactory; or those people who like to call the cinema the Silent Drama might like to talk of an Unseen Drama, too; or the more frivolous might call them the "Noises."

But, this little piece of pedantry apart, I have a very strong belief in the possibilities of the new form. It has certain obvious limitations which it is needless to recapitulate, and limitations are meat and drink to the artist.

We are at present simply practising, learning our powers, often on quite worthless subject matter which, by the melodramatic simplicity of its nature, is comparatively easy to make effective; just as a sailor, when learning to splice a rope, is not going to make his first attempt on a rope on which his life may depend, but on an old end that he can throw overboard. And, at the same time, our audience is learning how to listen—which is by no means so easy as it sounds.

R. E. Jeffrey

(Dramatic Producer, the British Broadcasting Company, Ltd.)

When people ask me this question, I always find it difficult to refrain from referring them to the little conundrum—can a duck swim? After all, why shouldn't wireless plays be possible?

We have already produced some 200 plays in our studios, and I venture to state they have proved as successful with our unique opportunities for producing "atmosphere" and generally stimulating the imagination, as those we are accustomed to see upon the stage.

Of course, listeners must come to our plays with as sympathetic and as ready-to-be-interested an attitude of mind as that with which they would attend a theatre. That is only a fair condition to lay down. They must also give as much attention to our efforts as they give when seeing artists on the stage.

When you come to consider that we continue to receive huge masses of letters from subscribers, representing some hundreds of thousands



ARNOLD BENNETT

of listeners, almost without exception appreciative of our plays and asking for more—it is comfortingly obvious that my optimistic opinion is thoroughly endorsed.

Naturally the art of writing for the radio is still in its infancy. Even the little ducks must find a difficulty in managing their feet when they first begin to swim. (And the little ducks represent both listener and broadcast dramatic people.) But the stronger they grow, the more possibilities open up for them—and so it is with us. There is literally no end to the possibilities of wireless plays.

In fact, our limitations are less than those imposed by the stage of a theatre. The pioneers both of writing broadcast plays, and producing them, are beginning to realise this. Every day fresh vistas are opening up to us, new rivers are waiting to be eagerly explored—and I am not afraid of the result that will be reflected in our post-bag.

THE BEST AERIAL WIRE

IN these days of "freak" types of aerial wire the best type of wire—enamelled wire—is likely to be overlooked. Most of the "freak" wires have in comparison great drawbacks either in respect of their flimsy and therefore unreliable structure, or owing to their comparatively high resistance to high-frequency currents.

The flimsy type of wire is generally made up cord fashion with a large number of very thin woven uninsulated copper wires. If these thin wires (the turns of which short each other) are unprotected from atmospheric effects they will speedily fall to pieces when erected in the vicinity of large towns. When the thin strands begin to decay and break, the effective H.F. resistance of the aerial will increase considerably and the acid corrosion of our smoke-laden atmosphere will speedily attack the copper and add to the losses in signal strength. Such decrease, however, may only be noticeable on very weak signals except in extreme cases.

Another type of aerial which seems to have gained popularity consists of a single strand of copper wire surrounded with a number of strands of tinned and coppered steel wire, the whole being covered with rubber and braid insulations. The strands of wire again short each other as they are uninsulated.

It is true that this wire is more efficient in most cases than an ordinary single-stranded conductor (uninsulated), mainly because it presents a good surface for the H.F. current to run over.

Efficiency

The pitch of efficiency which could be attained if all the strands of wire were insulated one from the other however, is only obtainable with an ordinary stranded enamelled wire. This latter presents a much higher skin surface for the H.F. currents than does either of the two types mentioned, and, moreover, preserves its efficiency since acid corrosion will not attack the enamel.

A. J. C.

A Four-valve Neutrodyne Receiver

Specially designed for long-distance reception (including American stations), this four-valve neutrodyne receiver is just the thing for the listener who wants to hear something besides his local station. It has been designed, built and tested by THE WIRELESS MAGAZINE Technical Staff.

As announced on p. 451, we are giving the original set away as first prize in a simple competition.



This Set is offered as a Prize in a simple Competition (see page 451).

IN previous issues of THE WIRELESS MAGAZINE the difficulties of obtaining proper high-frequency amplification have been discussed, and it has been pointed out that the trouble experienced is largely due to the coupling between the input and output circuits of the high-frequency amplifier.

Two Kinds of Coupling

The coupling may exist in two forms, magnetic and electrostatic. In the latter form the coupling is caused by the capacity between the electrodes of the valve and the sockets of the holder, as well as by

the capacity existing between the connecting wires and the components themselves.

The prevention of this instability due to the unavoidable back-coupling between grid and plate is to be found in the arrangement of the components, the method of wiring and the balancing-out of the remaining capacity by a method brought prominently to the public notice by Prof. Hazeltine, an American scientist.

This method, known as the neutrodyne principle, ensures that the grids of the high-frequency valves are operating at a fully negative potential, with the result that the valves

are working on the most suitable part of their curves for pure and efficient amplification.

Referring to the circuit diagram it will be seen that the primary of a high-frequency transformer is included in the plate circuit of each of the high-frequency valves, the secondary being connected in the usual manner to grid and filament of the following valve.

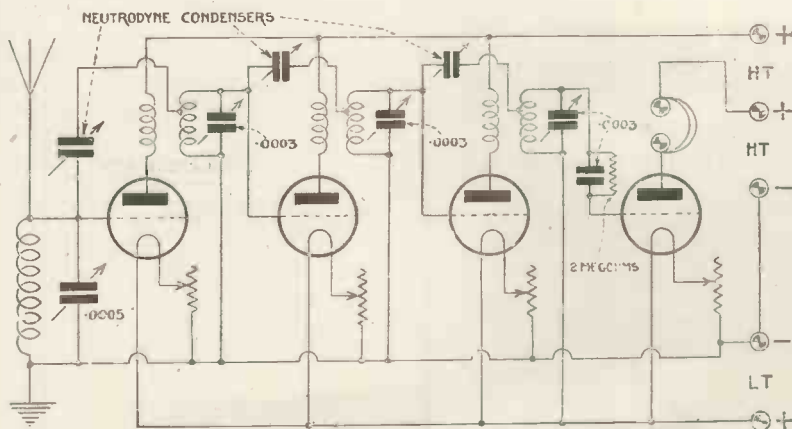
Back-coupling Effect

From a tapping on the secondary a wire is taken to a very small variable condenser and thence to the grid of the preceding valve, thus giving a back-coupling effect *opposite in phase* to that of the back-coupling effect between the elements of the valve and valve holder.

Thus the two effects neutralise each other and great stability is obtained.

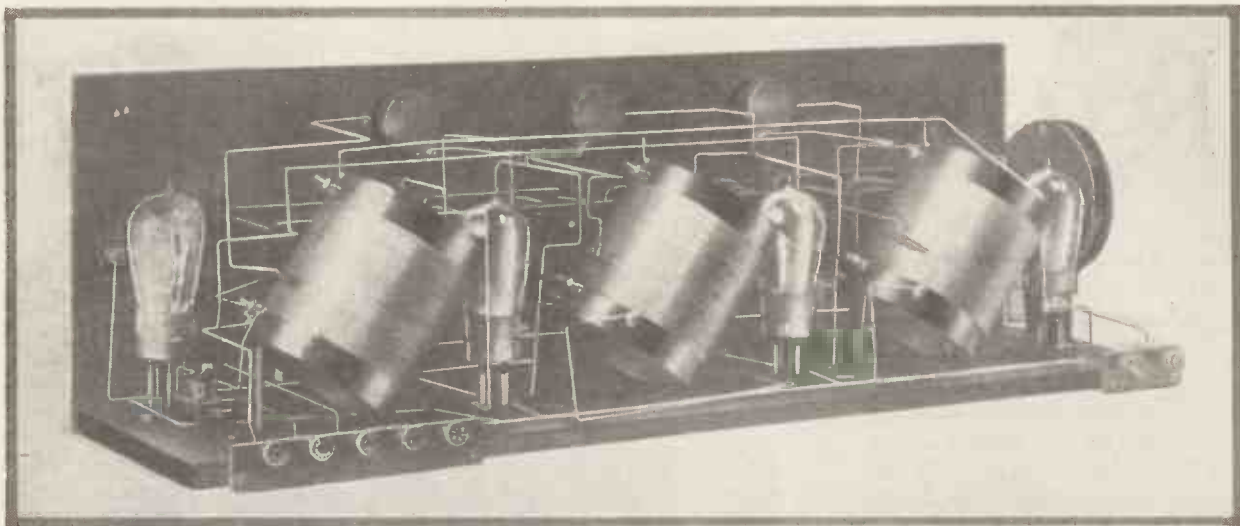
The small variable condenser—called the neutrodyne condenser—should have a capacity when adjusted of about twice that existing between the electrodes of the valve. As the capacity of this condenser is very critical, it is made variable. In order to minimise hand-capacity effects a long handle is usually fitted to each neutrodyne condenser.

By the method just indicated we can build up a set incorporating



Circuit Diagram of Four-valve Neutrodyne Receiver.

A Four-valve Neutrodyne Receiver (Continued)



A View of the Wiring and Disposition of the Components of the Four-valve Neutrodyne Receiver.

several stages of efficient high-frequency amplification, thus giving great sensitivity and selectivity.

A four-valve receiver constructed on these lines is described in this article. It is primarily intended for the reception of American and other far-distant stations which, if desired, may be amplified at low-frequency for loud-speaker work.

Special Transformers

It will be seen from the various diagrams and photographs that three special high-frequency transformers identical in mechanical detail and construction (and therefore identical in electrical characteristics) are employed.

In selecting these transformers it was borne in mind that the necessity of employing fine-wire coils on any

other form of damping device was rendered superfluous in view of the special method of preventing self-oscillation.

The design of the transformers has been carried out by the manufacturers for the purpose of combining signal strength with selectivity. For signal strength alone it is better to give the secondary winding about twice as many turns as the primary, whilst the selectivity is governed, as well as other things, by the distance between the windings and their ratios. In order to keep down losses the wire used in winding is of thick gauge, whilst to avoid magnetic coupling between the transformers each is so mounted that the axis is inclined at an angle of 55° to the horizontal.

The components required for the

construction of the set are as follow:

Ebonite panel, 26 in. by 8 in. (American Hard Rubber Co.).

Two ebonite terminal strips, $5\frac{1}{2}$ in. by 1 in., and $2\frac{1}{4}$ in. by 1 in.

7 terminals (Belling-Lee).

3 matched neutrodyne transformers (Peto-Scott).

3 .0003-microfarad square-law variable condensers (Success No-loss).

.0005-microfarad variable condenser (Success-No-loss).

3 neutrodyne condensers (Gambrell).

4 filament rheostats (General Radio Co., carbon type).

Single-way phone plug and jack (General Radio Co.).

4 valve holders, baseboard-mounting type (Peto-Scott).

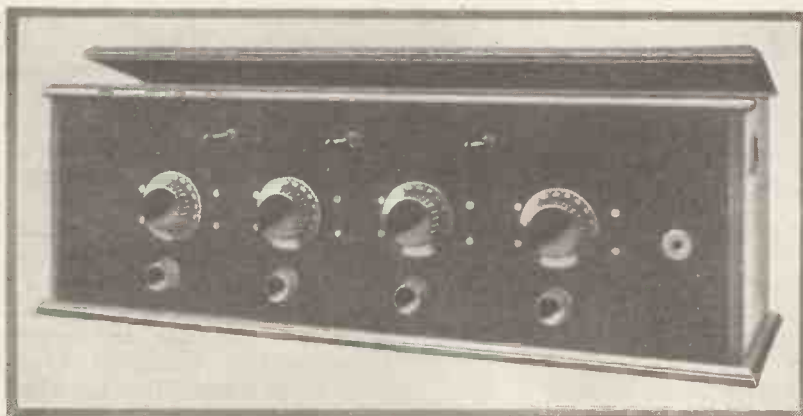
Fixed coil holder, baseboard-mounting type.

.0003-microfarad grid condenser and 2-megohm grid leak (Mullard).

Oak cabinet as shown in sketch (Carrington Manufacturing Co.).

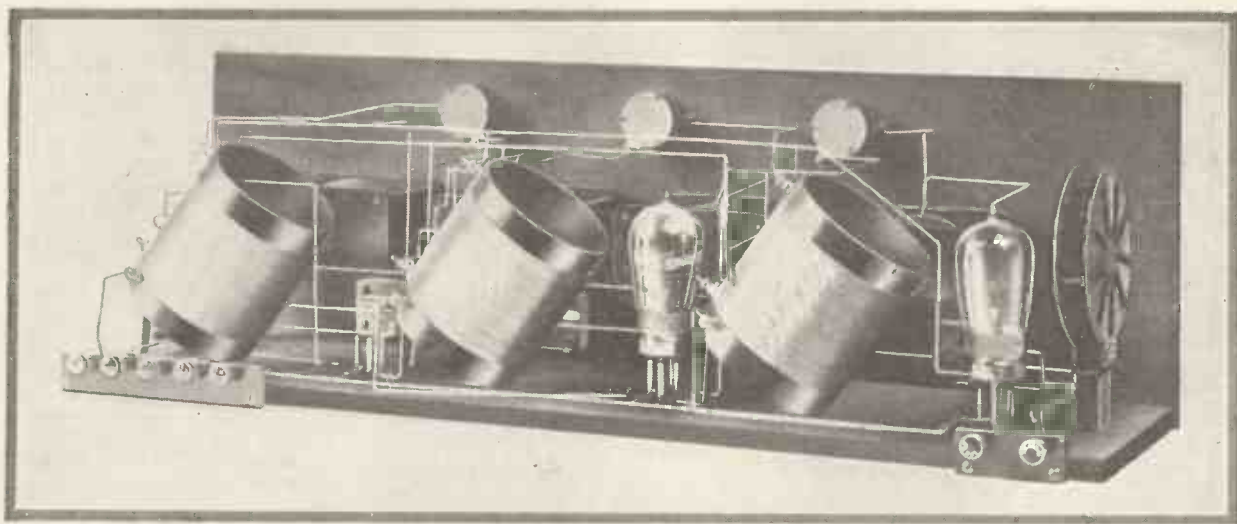
Baseboard, 26 in. by 7 in. by $\frac{1}{2}$ in. thick.

Quite a lot of time and trouble is saved by obtaining the panel from the manufacturers mentioned in the list of components. The dimensions are a stock size, and the edges and corners are already squared-up. Drilling may then be started immediately; as a guide a panel drilling diagram is given. From this the positions of the centres of all



Completed Four-valve Neutrodyne Receiver.

Designed by the Technical Staff of "The Wireless Magazine"



Another View of the Wiring of the Four-valve Neutrodyne Receiver showing the Arrangement of the Components.

the holes and their sizes can be ascertained.

Mounting the Condensers

Special care should be taken in mounting the variable condensers. These are not of the one-hole fixing type, but the manufacturers have included with each condenser a drilling template which will be found very useful.

The neutrodyne condensers and filament rheostats present no difficulties in mounting, all being one-hole fixed.

On the extreme right of the panel, looking at the front, the phone jack is mounted centrally. The instruments should be mounted on the panel after the latter has been drilled, and, for the sake of accessibility, a few connections should be made before the panel is attached to the baseboard.

Wiring the Condensers

A single straight wire, for instance, should be connected to the moving vanes of all four variable condensers, whilst a similar wire should connect together the central tags of the filament rheostats.

Projecting leads from both these wires and also from each of the remaining filament-rheostat tags are left for subsequent connection purposes.

The panel is next screwed to the baseboard by four 1 in. brass wood

screws. If it is desired to further strengthen the structure angle brackets may be bolted to the panel and baseboard at each end. As it is intended, however, to screw the panel to the cabinet, the use of angle brackets on the baseboard is unnecessary.

On the back edge of the baseboard, at each end, the ebonite terminal strips are screwed, that on the right-hand corner (looking at the back) carrying the aerial and earth terminals and that on the left-hand corner carrying the three high-tension and the two low-tension terminals.

Neutrodyne Transformers

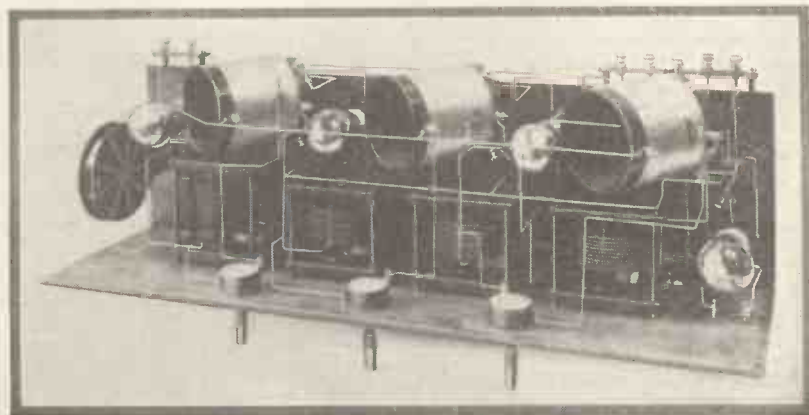
At equidistant intervals the three neutrodyne transformers are screwed down, leaving sufficient room in

between each to mount a valve holder and valve. Each outside transformer is spaced $7\frac{1}{2}$ in. from the centre one.

Wiring the Transformers

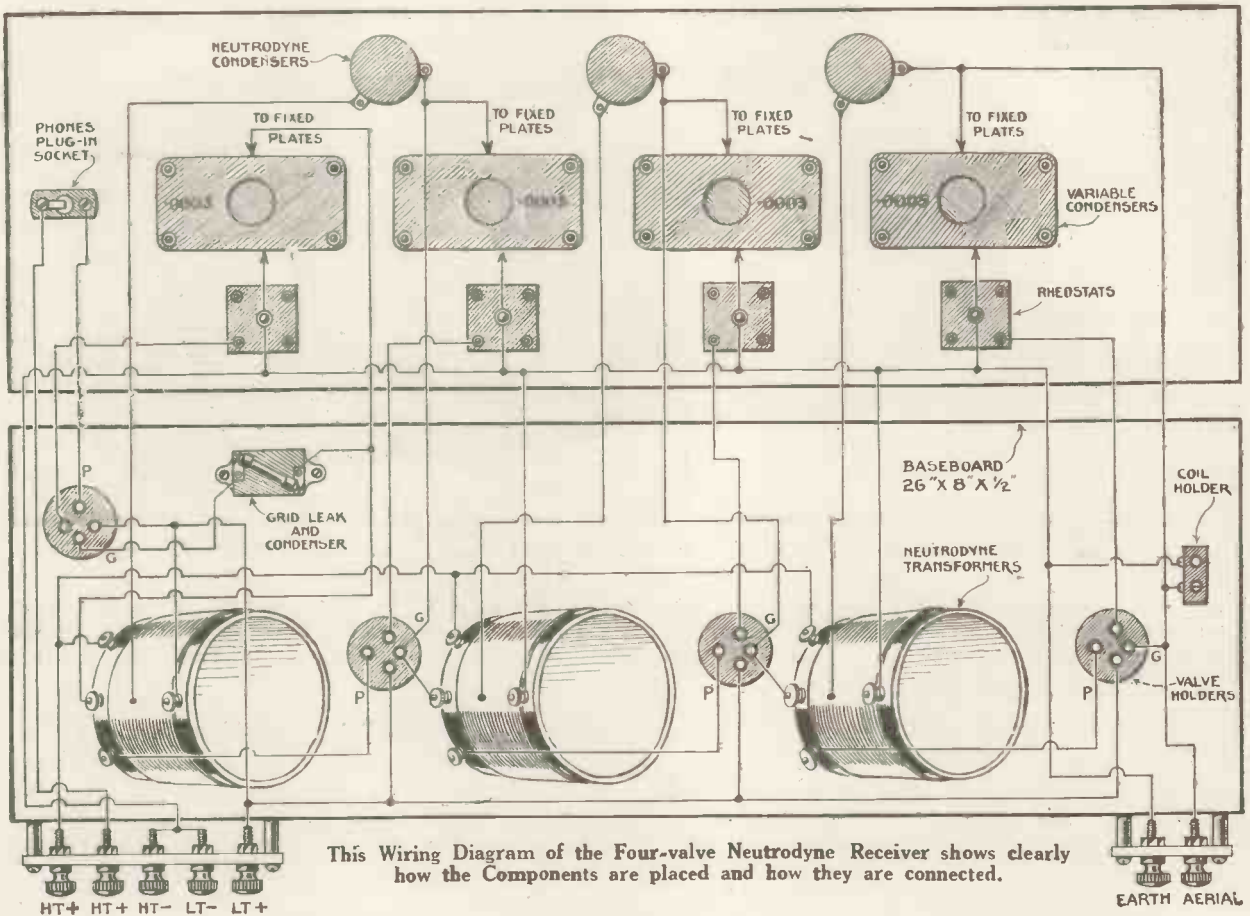
When wiring up the neutrodyne transformers it should be noted that the end of the secondary nearer to the neutrodyne condenser tapping is joined to the grid of the valve, the other end being connected to — L.T. (in the case of the high-frequency valves) or to + L.T. (in the detector valve).

As the transformers stand in position the top terminal connected to the end of the secondary is joined to — L.T., whilst the outer terminals connected to the primary are joined to the plates of the high-frequency valves.



This Photograph shows clearly the Neutrodyne Transformers and Condensers.

A Four-valve Neutrodyne Receiver (Continued)



Two high-tension tappings are provided, one supplying the three high-frequency valves and the other the detector valve.

Positions of Components

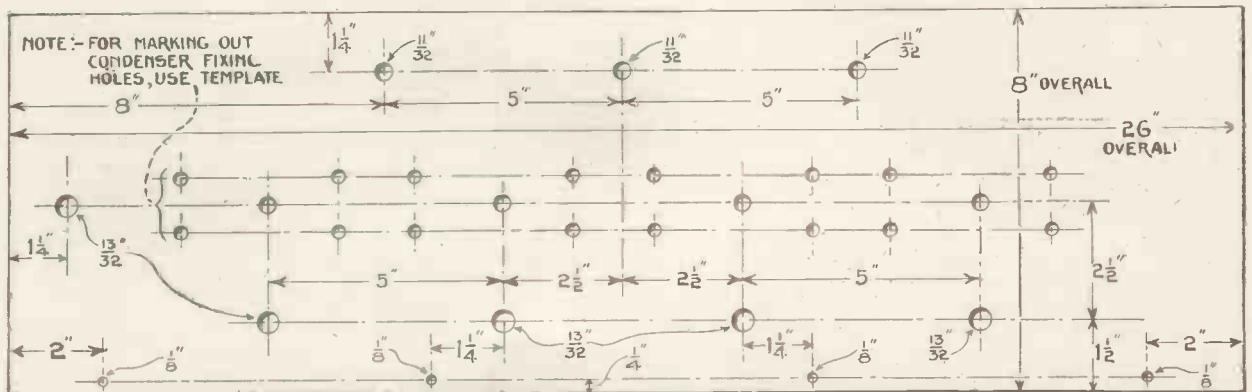
A developed plan of the baseboard and panel is given showing the positions of the components and the wiring. The projecting connections

already made from the rheostats, etc., on the panel should be connected up to the proper components on the baseboard.

Keep all plate and grid leads far apart and avoid running the leads in a parallel direction. For the sake of convenience the lead from the plate of the third high-frequency valve is connected to the back of the

primary terminal inside the ebonite former.

This point, although unimportant, has been mentioned for the reason that in the photographs this terminal appears unconnected. On close investigation it will be seen, however, that the lead is taken from the plate of the valve down through the centre of the former.



Quarter-scale Layout of Front Panel of the Four-valve Neutrodyne Receiver.

Original Given as Prize in a Simple Competition

Having completed the wiring, the set may be given a preliminary test. Connect up the batteries, aerial and earth to their respective terminals and the phone plug to the jack.

Adjustments

Adjust the filaments of the valves to a suitable brilliancy. Set the second, third and fourth variable condensers at about 90° and (having previously plugged a Gambrell A coil in the coil holder) search for signals by rotating the dial of the first condenser.

When a station is heard, adjust the three other condensers for best results. Take out the first high-frequency valve and stick a piece of stamp paper over one of the filament legs. This will prevent the filament from lighting, but the inter-electrode capacity of the valve will still be present and signals, although much weaker, will probably still be heard.

Adjusting the Condensers

Tune the circuit again to strengthen the weak signals if possible, and carefully adjust the first neutralising condenser, starting from zero capacity and gradually screwing it in. As the capacity of the neutrodyne condenser is increased, the signals should become weaker and weaker until a point is reached when no signal is heard at all.

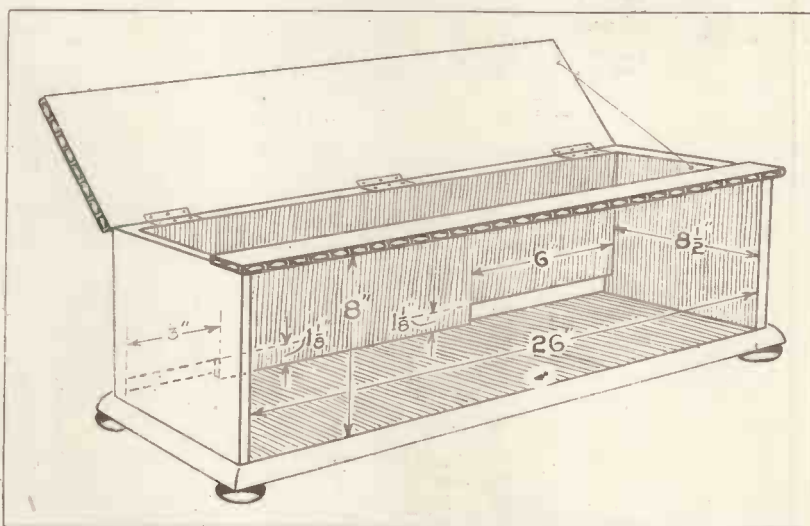
In order to test whether the stray capacities have been balanced, take the valve out of the socket, when signals should again become audible.

Remedies for both cases are obvious. Each high-frequency valve and neutrodyne condenser should be treated the same way in turn.

It will be found that a buzzer wavemeter is very useful in carrying

constitutes the oscillatory circuit of the wavemeter. A buzzer with a dry cell is connected across the oscillatory circuit.

If the last three condensers have their dials set correctly, tuning



Details of Cabinet for the Four-valve Neutrodyne Receiver.

out these preliminary tests. It need not necessarily be calibrated, although such a feature, of course, is desirable. A No. 50 tuning coil with a .0005-microfarad condenser in parallel

should be identical on all three. The reading of the first condenser will be slightly different owing to the capacity of the aerial and the different type of inductance.

Prof. E. Sopp's Fables

Specially Revised and Brought Up-to-Date for the Edification and Guidance of Wireless Amateurs.

NO. 4.—THE FAN AND THE VIPER

ONCE upon a Time, in the Depths of Winter, when Snow lay thick upon the Ground, an enthusiastic Wireless Engineer who lived with his Wife, her Mother, and Umpteen offspring in the Wilds of Peckham, found on the Threshold of his Abode a half-frozen Viper.

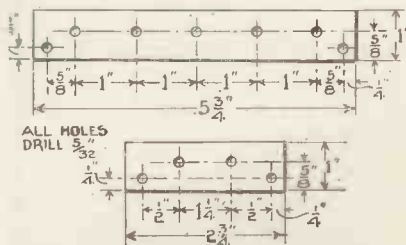
Gently picking up the poor Reptile, he, in the Goodness of his Heart, placed it inside his Doublet so that the Warmth of his manly Bosom might restore it to Life—the which he achieved with laudable Success.

In order to show Gratitude to

its benevolent Rescuer, the Viper bit, in quick Succession, the Fan's Mother-in-Law, the daily Girl, the Neighbour who got America and the local Collector of Taxes (who had haply called for the sixth Time), and having wriggled to a convenient Position on the Experimental Bench was on the point of bending a pet Thermionic Valve when it was promptly despatched by means of an .001-microfarad variable Condenser of hefty proportions.

MORAL: One can readily have a surfeit of a good thing.

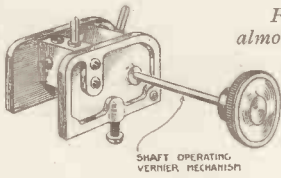
JAY COOTE.



Details of Terminal Strips for the Four-valve Neutrodyne Receiver.

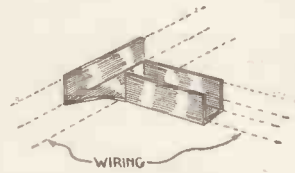
If on increasing the capacity of the neutrodyne condenser from zero the signals become stronger, then either the coils of the transformer are connected the wrong way round or the wiring is inefficient.

Novelties and New Apparatus



For tuning-in those far-distant stations it is almost essential to have a coil-holder with some kind of fine-adjustment device.

The Lotus coil-holder shown here is actuated by three sets of specially cut gears that give a reduction of 8 to 1. It is made by Garnett, Whiteley & Co., Ltd., of Lotus Works, Broadgreen Road, Liverpool.



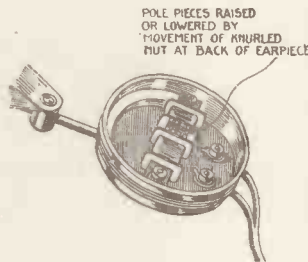
Home constructors will appreciate the usefulness of this Trix T connector for joining square-section wires at right-angles. The method of using it is clear from the diagram, in which the wires to be joined are shown by the dotted lines.

These connectors are marketed in envelopes containing a dozen by Eric J. Lever, of 33, Clerkenwell Green, E.C.1.

Many very cheap crystal detectors could be improved by the use of this Trix micrometer-adjustment detector arm, which is sold as a separate unit at a modest price.

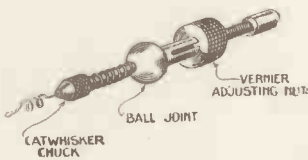
The catwhisker is first adjusted by means of the small knob and then the pressure is regulated by the larger knob.

The manufacturer is Eric J. Lever, of 33, Clerkenwell Green, E.C.1.



Made by C. A. C. Radio, Ltd., of 10, Rangoon St., Crutched Friars, E.C.3, these lightweight phones, whilst incorporating adjustable pole-pieces, weigh only about 5½ oz. complete with 6-ft. cords.

They are very light and comfortable to wear for even long periods.

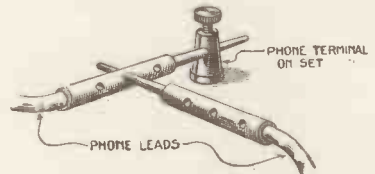
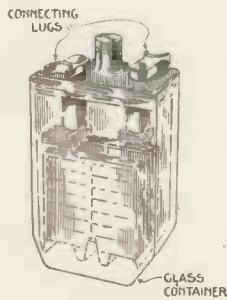


Oldham's have just produced this new type of accumulator cell for making up high-tension batteries. Sturdiness of construction is a feature of the cell, a thick glass container being used.

A noteworthy point is the large-size vent hole into which a plug is screwed; this makes it an easy matter to keep the level of the electrolyte up to the right height.

Each cell contains one positive and one negative plate, these being provided with substantial connecting lugs; they are kept in place by ridges moulded in the container.

These units can be obtained separately or in racks containing twenty cells. The address of Oldham & Son, Ltd., is Denton, near Manchester.

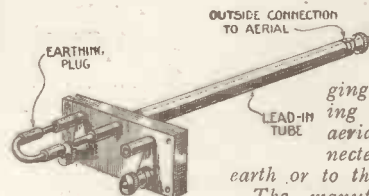


The phone-lead tags of the C. A. C. lightweight phones (see illustration above) are of special interest to those who want to use more than one pair of phones at a time.

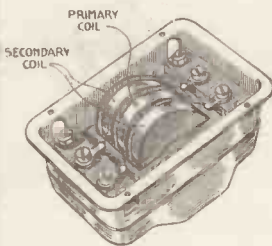
Each tag has three holes in it to accommodate other tags; thus four pairs of phones can be easily connected in parallel without the necessity of using extra large-size terminals or patent external connectors.

This Tame Side combined lead-in tube and aerial-earthing switch has a number of obvious advantages. The left-hand terminal is connected to the set.

By plugging in the shorting strip the aerial is connected either to earth or to the set.



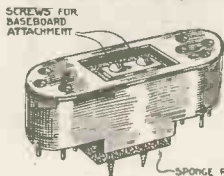
The manufacturers of Tame Side products are Hirst Bros. & Co., Ltd., of Roscoe Street, Oldham.



One of the latest to be put on the market, the Marconiphone Ideal Junior low-frequency transformer retains in a simplified form the Ideal principles of construction. It has a ratio of 3 to 1 and carries with it a six months' guarantee.

The address of the Marconiphone Co., Ltd., is 210-212, Tottenham Court Road, W.1.

Illustrated and Described



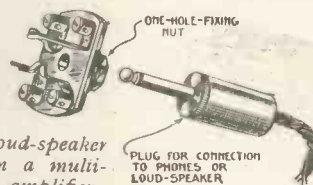
Everybody knows how some dull-emitter valves "ring" when subjected to the slightest vibration; this Marconiphone valve holder has been developed to overcome this nuisance.

The insulating material is supported on a comparatively

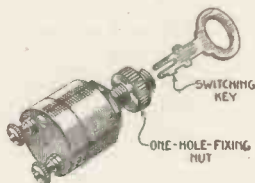
large block of absorbent rubber sponge, which effectively damps down vibration.

The address of the Marconiphone Co., Ltd., is 210-212, Tottenham Court Road, W.1.

A product of the General Radio Co., Ltd., of 235, Regent St., W.1, this neat plug and jack can be used for plugging in phones or a loud-speaker after any stage in a multi-valve low-frequency amplifier.



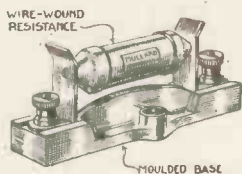
It will be noticed that one-hole fixing is employed—a feature of great convenience to home constructors.



A key switch for "locking off" the low-tension supply.

This Decko key switch is a useful component to incorporate in any set that is to be used where there are youngsters about. It is impossible to switch on the filament current until the key is turned in the switch.

This device is marketed by A. F. Bulgin, of 11, Cursitor St., E.C.



Wound with wire, this Mullard Ever-rest anode resistance, supplied in resistances of 80,000 and 100,000 ohms, has a resistance value that is constant within 3 per cent.

The address of the Mullard Wireless Service Co., Ltd., is Nightingale Lane, Balham, S.W.12.

To Take Full Advantage of These Pages

it is advisable to supplement the brief particulars that we are able to give in the limited spaces at our disposal by writing to the manufacturers concerned for fuller details.

For instance, makers of valves and transformers are, in most cases, only too glad to send interested enthusiasts sample characteristic curves of their products.

In this respect we give our readers as much help as possible by putting the manufacturer's name and postal address alongside each piece of apparatus described. A post card mentioning THE WIRELESS MAGAZINE will result in the firm concerned giving you all the special information that you may require.

By following out this suggestion the home constructor will keep himself informed of all the best developments that take place month by month—and that without waste of time.

Shown below is the receiver unit of the new Sterling Mellowox loud-speaker marketed by the Marconiphone Co., Ltd., of 210-212, Tottenham Court Rd., W.1.

The diaphragm is adjusted by means of a knob at the back of the instrument.

The instrument is supplied in several different colours.



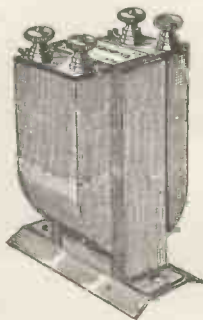
Special DE 8 valves are made for high-frequency and low-frequency amplification.

The DE 8 is a new type of valve made by the Mar-

Claimed to amplify without distortion over a band of frequencies of 200 to 4,000 cycles per second, this new Brandes low-frequency transformer has been so shielded that two stages of magnification can be used without mutual interference. It has a ratio of 5 to 1.

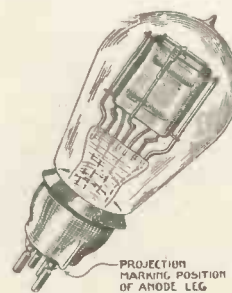
Brandes, Ltd., have London offices at 296, Regent St., W.1.

The self-capacity was found to be 48 micromicrofarads.



coniphone Co., Ltd., of 210-212, Tottenham Court Road, W.1. Made specially for high-frequency work, the DE 8 H.F. has an amplification factor of 16, and takes 12 ampere on the filament at 6 volts.

The DE 8 L.F. (specially made for low-frequency work) has an amplification factor of 7 and takes the same filament current as the DE 8 H.F.



The Love Ruse

A Wireless Story by ALEC WAUGH

Illustrated by A.S. Waye

1
THERE have been written fairy tales enough of the mortal who has placed by some lucky hazard an immortal in his debt. "You have but to ask," announces the rescued genie, "you have but to ask, and it shall be given you." And always where the wealth and kingdoms of the earth are there for the requiring, always in fairy tales is the lordly dispenser of felicity astounded by some such modest request as a cottage in the Cotswolds.

In real life things happen rather differently. But even here it would seem impossible to say, without incurring the risk of a generous surprise, "If ever at any time I can be of service to you, you'll be sure, won't you, to let me know."

Of course, to be taken at one's word at all is a considerable shock. One says, "If ever I can help you" in the same way that one says, "Do ring me up some time." It is a social courtesy that commits neither party to the necessity of action. Moreover, it is usually to persons unlikely to stand in need of them that we are most profuse in the offer of our services.

Certainly it was without any expectation of its ultimate redemption that Carlo Frederick, at the close of an exciting day in the City, presented John Boulevardier with an assurance of his desire at any time and at any place to do anything that lay within his power in return for that day's guidance. How was he, indeed, an overworked and none too affluent musician likely to be able to assist a person to whom chance had been as generous as it had to John Boulevardier? Boulevardier had money and he had position; youth was his, too, and popularity. To the uninformed observer he had everything in life worth having. He was the sort of fellow, in fact, of whom

people say: "If I weren't myself, he's the person I'd like to be."

One thing, however, he did not possess. For all his efforts Marjorie Montrose remained unconvinced that life without his permanent companionship would be a savourless dish for her; and the infuriating thing about it was, that once, a year earlier, they had been half engaged. For six months they had danced together, and dined together, and gone to first nights together. Often enough the *Times* had been opened with the remark: "Let's see if Boulevardier's announced his engagement yet." Hostesses had even wondered whether it would not be a discourtesy to invite them separately.

But then there had been a quarrel, an absurd, unreasonable quarrel; and two days later Marjorie had been hurried by a parent's illness out of England to the South of France and, on her return ten months later, Boulevardier's attempted reconciliation had been countered by a cold, impenetrable reserve. As he explained to a friend, one could simply do nothing with her.

"I can't make love to an ice wall," he said. "I'm not built that way. When she looks at me out of those cold, wide, grey eyes I can't find a single word to say. I just can't begin. We talk as though we were polite strangers meeting at a party for the second time. I ask if she's seen this play, and she asks me if I've read that book. Hopeless, perfectly hopeless. And the maddening part about it is that I'm certain if we could only get into the right mood I could win her back. We mattered so enormously to one another once. But so long as she looks at me like that, I cannot say the things that I know would move her. I must be in the right mood, and she won't let me get into it."

"If that's the case," his friend replied, "you'd better imitate the

Italian lover and get someone to play a serenade beneath her window."

He made the suggestion with a laugh, but, like so many other suggestions that are flung out jokingly, it started a train of thought. At any rate, it resulted in Carlo Frederick receiving on a certain Saturday morning the following telegram from John Boulevardier:

Meet me Paddington Main Line
Booking Office, 10.5.
Rely on you. Most important.

II

"I'm sorry," John Boulevardier was saying, "that I cannot offer you a more exciting drink than ginger beer, but I suppose I must hold myself in part responsible, along with the other thirty million voters, for my country's laws. If you would care for a ginger beer, however— You would? Then we will go and talk in a quiet corner of the refreshment room.

"Now the point," he continued, "my dear Frederick, is that some while back you were nice enough to say that if ever I should happen to find myself in need of your assistance—"

"And I assure you—" Frederick started to protest, but Boulevardier stayed him.

"My dear Frederick," he said, "I have never had the slightest doubt of the sincerity of your promise. I have only hesitated up to now to remind you of it because the opportunity has never previously. . . . But," he interrupted himself, "I must not digress. My train is due to start in fifteen minutes. The point is this. You are conducting this evening, I believe, the Corona Orchestra?"

"Yes," he was told, "at Clariton's Hotel."

"And the entertainment is to be broadcast, I believe?"

Frederick nodded.

"Exactly. Now tell me: it will be dance music, I suppose? Which is to say that there will be no fixed programme, and you will be able to play within limits what you choose?"

"Yes," Frederick answered; "within limits."

"Good. Now what I want you to do is to play at the following times the following tunes: At ten minutes past ten 'Horsey, keep your tail up!' three dances later, 'What'll I do?' Miss two, and then 'You know you belong to somebody else.' And as an extra you can play 'Dancing Honey-moon.'"

"But they're old, old tunes," he protested weakly.

"I know," said Boulevardier cheerfully. "A year old, all of them. That's why I chose them."

over it. People hate old tunes. Still——"

John Boulevardier placed a reassuring hand upon his shoulder.

"If all goes as well, my dear fellow, as I hope it will, I'll sign you on as a member of my personal staff for life. You can rely on me, Frederick. You shall not want. And now," he added, "I must be catching the train to Mrs. Harrington's week-end party."

III

"I THINK," remarked John Boulevardier that evening at nine minutes precisely after ten, "that there would be worse things for us to do than dance. The Corona Orchestra is, they tell me, grappling with life at

up!" and John Boulevardier was bending towards Marjorie Montrose. "Please?" he said.

For a moment they danced in silence. Then:

"Does this tune remind you of anything?" he asked.

"Of a great many things."

"But nothing in particular?" he insisted.

She shook her head. "I don't think so," she replied. As far as it is possible to shrug one's shoulders while one is dancing, John Boulevardier shrugged his.

"Ah well," he said. "But then I could hardly have expected that you would. It was the tune they were playing when we quarrelled."

She made no reply. Her eyes, could he have seen them, were doubt-



He smiled. "It was the tune they were playing that first evening before you came into the room"

"But——"

"But there is no but. You can put 'By special request' if you like. The great thing is that you should play them."

Frederick shook his head.

"I'll have to, I suppose," he said. "I shall probably get into trouble

Clariton's. I would not myself dare to tamper with a friend's wireless, particularly with a four-valve set, but if Mrs. Harrington would be so kind——"

A minute later the wide, oak-floored room was filled with the strains of: "Horsey, keep your tail

less icily cold. But here in this warm, softly lighted room, with the sound in his ears of a music that he had never heard without a quickening of a pulse, with the foreknowledge of what was coming, with the situation, in fact, prepared for him, he could speak with the confidence that in the

THE LOVE RUSE (Continued)

preceding weeks had been denied him.

"It is the tune," he repeated, "that the band was playing that evening that we quarrelled. Every time I hear it the details of that night come back to me. I'd never been to that restaurant before. I shall never see it again. But I shall remember as long as I live the exact colouring of its walls, the exact spacing of its window frames and mirrors. I can remember exactly what the waiter looked like, and what the cloak-room attendant said when he handed me back my hat. And all the time that we were quarrelling the band was playing 'Horsey.' But you've forgotten that."

"Of course. How should I be expected to remember it?" She spoke quickly, impatiently—a change of intonation that he noted eagerly. It was better for her to be angry than unmoved. He had at least broken through that emotionless reserve.

There were six of them dancing altogether. At the end of each dance there was a change of partners, and it was not till the first bars of "What'll I do?" had been transmitted that John Boulevardier was again beside her.

And again for the first minute or so they danced in silence.

"It's curious," he said at length, "that they should be playing this thing tonight. Does it mean anything to you?"

She bent her head slightly forward, and her voice, it seemed to him, was a little softer.

"Perhaps," she said.

"To me it'll always mean that afternoon at Ranelagh." And there was in his voice a warmth now, and a confidence.

He could say to her now the words that for so long had trembled

unuttered on his lips, the music had provided him with a platform from which to speak.

"Always it'll mean that to me," he said. "The tall trees, and the sunlight, and the wicker tables on the terrace, with the red-coated footmen hurrying between them; and the music of 'What'll I do?' murmur-

music's rhythm, but to be pliant and responsive to it.

"And whatever happens," he continued, "I'll always be grateful for that day. It was the biggest hour of my life. Nothing that can happen can ever take it away from me."

Right through the dance wooingly with soft words he spoke to her.

His heart was beating and his eyes were bright as he turned when the music began again to his next partner. "You can always get back," he had once been told, "a woman who has once loved you, provided that you love her still yourself." And he had known that, could he only say them, there were certain things against which Marjorie's defence would be unable to hold out.

There was a smile upon his lips, and the light in her eyes was no longer cruel, when once again, and with the notes of "You know you belong" trembling upon the air, he stood with an outstretched hand beside her.

This time there was no preliminary silence.

"You remember what this tune is?" he asked.

"I remember," she said quietly.

"It's as though we were having this evening the whole of our love story played over to us. There was the tune we quarrelled through; the thing that was being played on the afternoon

when I said I loved you; and now here's the first dance we danced together. The first words we ever said to one another were said under the cover of this music. I knew the moment I saw you that you were different from any girl that I had ever met before. I walked straight over to our hostess: 'I want to be introduced to that girl,' I said. And I don't suppose I shall ever know a greater thrill than that first sound of your voice." He hesitated.

THE LISTENERS' INN!



"Cut it short, 'Erb. Didn't yer 'ear! In one minute you will receive 'local booze.'"

ing from the huge, gilded bandstand, and I telling for the first time I loved you, and you leaning forward across the table, your face shadowed by a wide white hat; and then slowly lifting your eyes to smile. As long as I live it'll mean that to me—this music."

She made no answer, but as he spoke, the rigidity with which earlier in the evening she had danced ebbed gradually out of her, so that her body seemed to him no longer resisting the

A Wireless Story by Alec Waugh

"But I've told you it so many times, Marjorie. You must be tired now of hearing it."

"There are some things," she said quietly. Then paused. "Oh, I don't know," she added.

The music stopped. Through the loud-speaker was transmitted the clatter of a large crowd's clapping, there was a sound of laughter, the vague murmur of conversation. Then once again the opening bars of a fox-trot.

"But you won't remember this," he said.

She listened, and the smooth white surface of her forehead was creased with thought.

"No," she said, "no; it's 'Dancing Honeymoon,' of course, but—"

"But for us," he suggested.

She nodded. "As regards us—nothing."

He smiled. "It was the tune they were playing that first evening before you came into the room. It's got for me—well, how shall I put it?—the sort of sentiment that one associates with last moments. I was, you see, a different person then. The self that I was, the old self, died that evening. I became someone completely other. I don't quite know what I was before that evening. A rather trivial, a rather worldly person, I imagine. Someone who spent his time lazily, selfishly, who was content with a round of parties and theatres and receptions. A trivial worldling, that's what I was when they began to play 'Dancing Honeymoon' that evening. But by the time the dance was finished, well, I was a different person; a person who was going to be content with that sort of life no longer, who wanted one thing and one thing only."

She did not answer him. But the long, tapered fingers tightened upon his shoulder.

"And ever since," he added, "that's all I've been. A person who's wanted one thing and one thing only, whom one thing only can make happy."

IV

THERE was not that evening very much more dancing. It was growing late and they were tired after their journey. In the half light of the

staircase Marjorie Montrose and John Boulevardier were standing.

"For the first time for nearly a year," he was saying, "I've been almost happy."

"I, too, perhaps."

For a moment he thought how centuries ago under Italian balconies a hired minstrel would prepare the road for his master's courtship.

How different and yet how much the same! The shapes of life might alter, but life itself, the essence under the changed conditions, that remained.

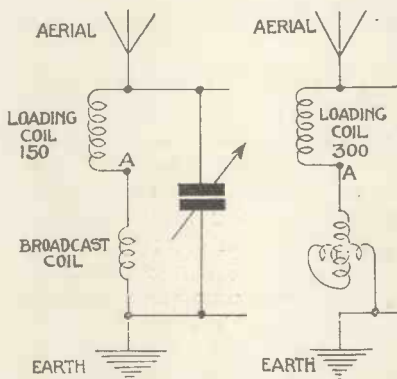
For a moment, but for a moment only.

"I, too, perhaps," she repeated quietly, and there was in her eyes that of which there could be no denial.

Loading Your Set for Daventry

THE Daventry coils on sale are found to be mostly "baskets" of 150 turns. These are quite suitable for loading a set consisting of a coil tuned by a condenser in parallel, so that truth in advertising may be said to be inviolate. They are, however, quite useless for loading a variometer.

Using the 150-turn coil it is quite



Correct Methods of Loading.

possible that the high-power station may be received at good strength within a radius of fifty miles, since the high power will set up forced oscillations over a wide band of wavelengths. Results will not be as good as they might be, however, and at greater distances than 50 miles the results will fall off to silence.

The coils sold for loading, in conjunction with a normal aerial, if untuned by a condenser will not give a wavelength exceeding 900 metres. A variometer tuning a wavelength band of from 250 to 600 metres is, at its maximum position, only equivalent to a coil of some 50 turns, and moreover has only a comparatively

small tuning range when used with a large loading coil.

It will be seen, therefore, that it is impossible to reach the 1,600-metre wavelength of the high-power station with such a combination.

Tests were carried out with a well-known make of variometer and a single valve, when it was found that signal strength increased with the size of the loading coil up to one of 300 turns. The correct size of loading coil for 1,600 metres may be taken as being between 250 and 350 turns, varying with the type of variometer and make of coil in use.

Two commercial loading coils in series will be found to approximate to the correct value.

Correct Connections

There still appears to be a good deal of misconception as to the correct way to connect a loading coil to a receiver.

The crystal or grid of the valve, as the case may be, should be connected to the aerial end of the coil, which is as near as we can get to the point where the greatest changes of potential occur, without taking experimental tappings. The diagram shows the correct methods of loading.

Probably the simplest way of effecting this change of circuit is to provide an additional terminal, shown as A in the diagrams. The connection from the coil or variometer to the aerial terminal should be removed to this, leaving the crystal or grid of the valve still connected to the aerial terminal.

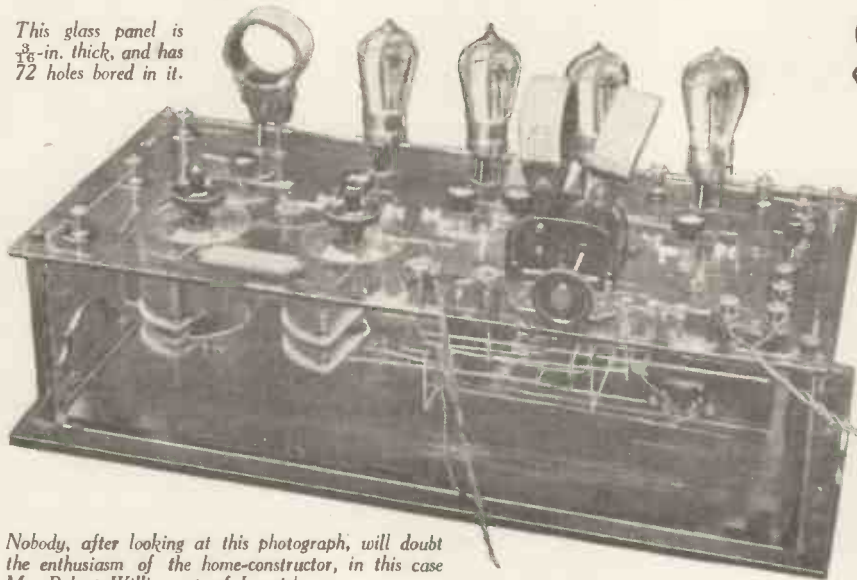
The loading coil is connected to these two terminals, which must, of course, be shorted when it is desired to receive on ordinary broadcast wavelengths.

S. E. N.

In Wiring & Spacing Your

Set —

This glass panel is $\frac{3}{8}$ -in. thick, and has 72 holes bored in it.



Nobody, after looking at this photograph, will doubt the enthusiasm of the home-constructor, in this case Mr. Robert Williamson, of Lerwick.

There are numerous points that must be given full attention if the best possible results are to be obtained—points that are often overlooked in the hurry and excitement of finishing off the work quickly. This article will remind home-constructors of some of the important details in building a set.

IT often happens that one particular receiver, say a straightforward three-valve affair, is very easy to tune and control, while another set of the same type and to all appearances identical, is a whistling, howling horror, and can only be tuned by the wireless expert of the house—the women folk and mere broadcast listeners giving it up in despair.

Bad Spacing and Wiring

The cause of such trouble (other things being equal) is almost certain to be due to bad spacing and wiring in the set, for an easily tuned and silent receiver is entirely dependent upon these two factors, no matter how Rolls Royce-like the components may happen to be.

From this point of view the first consideration when building a set is the size of the panel, which of course depends upon the type of set to be constructed. If the panel is too small the set is extremely difficult to tune, and very erratic owing to interaction between components and wires. If the panel is too large, loss of signal strength is likely owing to long leads, and interaction is also present, although not to the same extent as with a small panel.

For a one-valve set with or without reaction, an ebonite panel 10 in. by 6 in. is a more or less standard size, except in the case of "super" or reflex sets, where, owing to extra components and greater wiring, a panel minimum of 12 in. by 12 in. is usual.

When some composition other than ebonite is used it is advisable to cut this to a slightly larger size than if ebonite were used, and space the components farther apart. In this way a composition which is not such a good insulator as ebonite is made to almost equal the latter. The same applies to inferior ebonite—if you happen to know when you are buying it.

Panel Size

It is a good plan to cut the panel of such a size that all the components can be comfortably mounted thereon instead of mounting some of the parts on the ebonite and some on the walls of the cabinet, for in the latter case difficulties arise, owing to wiring, when it is desired to examine the underside of the panel at any future time.

For straightforward sets the table gives the usual minimum sizes.

With panels of these sizes it should be possible to make a silent and easily tuned set, as ample allowance has been made for all magnetic fields and interaction effects likely to cause trouble.

H.F. and L.F.

High-frequency components require more room than low-frequency components, and wiring is always more convenient if the panel is longer than it is broad. For sets with half-a-dozen stages of H.F. it is usual to increase the panel 3 inches for each valve, keeping the breadth more or less the same, that is, 8, 10, or 12 in.

In the case of "super" or reflex sets it is usual to increase the breadth of the panel as well as the length for each additional valve. There is then more room for the extra components opposite to, and parallel with, their respective valve sockets, and interaction and capacity effects between wires are not so likely.

Where heavy low-frequency transformers are employed, ebonite $\frac{1}{2}$ -in. thick or more is most suitable, and is always advisable for sets having low-frequency amplification only. For light H.F. transformers $\frac{3}{16}$ -in. thick ebonite is best. The thinner the

IN WIRING AND SPACING YOUR SET—(Continued)

ebonite, provided it is strong enough, the better, especially for high-frequency work on short waves, as air is a better insulator than ebonite.

Before boring any holes it is a good plan to arrange the components temporarily on the panel, and also to mark out the positions of the terminals lightly with chalk, keeping in mind the fact that the grid and plate wires, especially of the high-frequency and detector valves, should be as short as possible. Each high-frequency stage should follow in sequence from the previous stage, and no wires for the second H.F. stage should pass back over the first H.F. valve.

Poked into a Corner

For instance, what so frequently happens is that the grid condenser and leak (instead of being inserted in their proper place between the last H.F. valve and the detector) are poked away in some convenient little corner near the aerial terminal or against the grid of the first H.F. valve, or somewhere else where a lot of wires which have nothing to do with them are passing over and by them. If possible let no stray wire pass near the grid condenser at all.

Having arranged the components temporarily on the panel try and visualise the magnetic fields likely to be set up by any coils, transformers or wires. The low-frequency circuits do not matter so very much and L.F. space should always be sacrificed for H.F. space, although L.F. transformers if not shrouded should be kept well apart and with their axes at right angles to each other. The latter statement also applies to H.F. transformers, only more so.

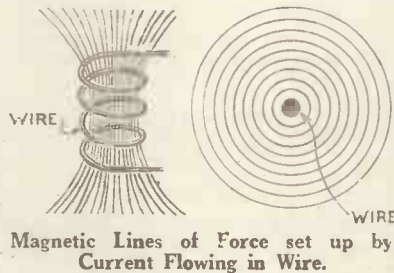
Arrangement of Coils

All coils should be arranged so that they are as far apart as possible, and with their axes at right angles to each other. For instance, trouble is often caused by placing the aerial coil in the field of a transformer winding. The field of a basket coil extends over a greater area than that of a honeycomb or cylindrical coil, and the latter are therefore to be preferred for mounting inside the set.

When a current flows through a wire magnetic lines of force are set up round the wire (see the diagram) and the larger the current

the greater the number of lines of force. When a high-frequency current is sent through a wire the lines of force are alternately increasing and decreasing as the current increases and decreases. When these lines of force cut another conductor a pressure is set up in the latter.

Thus the complications which arise in a receiver when the wires are criss-crossing each other indiscriminately can well be imagined. For example, a grid wire induces



a current in a plate wire which happens to be near by. Thus, besides its ordinary current, the plate wire is also carrying a super-imposed current which is changing its direction at the frequency of the incoming signal; and the lower the wavelength the greater the frequency, that is, the lower the wavelength the more often the current is changing its direction per second, and causing trouble in the plate wire.

That is why, capacity effects and

Of course, a wire connected to a transformer must to a certain extent pass through its field, but what is meant is that wires having no connection with the transformer should not do so.

Degree of Coupling

When two coils are mounted with their axes at right angles to each other the mutual inductance is at a minimum. In the same way the fields of two wires cutting each other at right angles have a minimum effect on each other, whereas if they run parallel the maximum effect is experienced.

When the rotary plates of a variable condenser are connected to earth (as they should be if the condenser is in parallel with the aerial-tuning inductance to avoid hand-capacity effects), these plates are extremely likely to distort the magnetic field of any near-by coil or transformer when they are moved. In fact, a sort of "spade" tuning takes place.

In a properly wired receiver it is essential that not only the grid and plate wires, but all other wires should be as short as possible. One frequently sees unnecessary wires running from one end of the panel to the other, especially wires to earth, which (as the constructor explains) do not matter!

Sometimes they matter enough to

TABLE OF PANEL SIZES FOR VALVE SETS

No. of Valves.	Combination.	Size of Panel.
Two-valve	H.F. and D., or D. and L.F.	12 in. by 8 in.
Three-valve	H.F., D., L.F.	12 in. by 10 in.
Four-valve	H.F., D., 2L.F.	14 in. by 10 in.
Four-valve	2H.F., D., L.F.	15 in. by 10 in.
Five-valve	2H.F., D., 2L.F.	18 in. by 10 in.

interaction are more prevalent on short waves, that is, with greater frequencies, than on long wavelengths or slower frequencies.

It is essential that wires carrying H.F. currents should not have to pass through the field of a coil or transformer; if they must do so, the wires should be so arranged that the field radiated by the wire is at right angles to the field radiated by the coil or transformer.

completely upset the stability of the receiver, for it is nothing but one mass of magnetic lines of force and any superfluous wires or metal must affect these fields. In such cases it is rarely necessary to take a wire right across the set to, say, the earth terminal, for there is sure to be a near-by lead also connected to earth. It is wonderful how short the wiring can be made.

(Continued at foot of next page.)

"Esperantised" Broadcasting?

Reflections in Lighter Mood

NOW that Esperanto has received official recognition by the French Government, allowing its use over telephone and telegraph cables, it will become, presumably, a fashionable language in that country.

Energy and Enthusiasm

Without doubt, Esperantists possess a vast store of energy and enthusiasm and are doing their utmost to implant this artificial language in all countries, but I am hard to convince that it is the one and only successful means of conveying wireless messages by broadcast to inhabitants of all nations.

Most certainly Esperanto enjoys the musical fascination of the Italian language—those melodious sounds pleasant to all ears—but to persons who have no knowledge but that of their own native tongue, its vocabulary is not so easy to learn as its protagonists would make out.

Personally, I only hope that if they do succeed in getting this language adopted by the high-power broadcasting stations for the dissemination of news and lectures of international interest, they will not "Esperantise"—is that the word?—the geographical names of cities and other places. I do not doubt that many well-known

Esperanto has its disadvantages, says Jay Coote, who in this article reflects on, what might happen if geographical names are "Esperantised."

districts of London would benefit by the change, but would it not be rather puzzling to listeners to hear references made to "Croce di Re" for King's Cross, "Blanca Capella," for Whitechapel, or "Bosco di San Giovanni" for St. John's Wood?

Of course, these names would

cast a romantic glamour over these hum-drum suburbs, but . . .

Southend, for instance, would be hardly recognisable if gallicised as "Midifin," but would it not take on a wonderful watering-place touch if, similar to Baden-Baden, it were aristocratically double-barrelled, "Suedende-Suedende."

But then Southend under any other name would smell as sweet! (Shakespeare might have said this, but he didn't. I got in first, so there!)

A New Gazetteer

Anyway, I shall be prepared for the change and, in anticipation, contemplate compiling a new gazetteer. You may—or may not—find it in the Indices of the British Museum and Bodleian Libraries under the heading: "Esperantists, Geography, New, for the use of."

Very well, then!

JAY COOTE.

IN WIRING AND SPACING YOUR SET—(Continued)

It is, however, preferable to have the components well spaced with comparatively long leads than cramped together and connected with short wires.

At the present time there are two distinct types of wiring, ordinary and anti-capacity. Ordinary wiring is done with the orthodox insulated or sleeved wire such as bell wire, whereas bare wire is used in the anti-capacity method.

Anti-capacity Wiring

While ordinary wiring is quite efficient the anti-capacity method is undoubtedly the best owing to the reduction of capacity effects due to the lack of insulation on the wire and interaction generally. Ordinary wiring is perhaps more suitable for portable sets where there is less chance of a "short" should the wires touch. It is a good plan to have all leads carrying high-frequency currents of bare wire and all other leads such as those carrying low-frequency and direct currents consisting of

insulated wire; under these conditions the set is comparatively safe even if subject to rather rough usage.

Right-angle Bends

It is usual in anti-capacity wiring to give the wires sharp right-angle turns so that they will only run in three planes and thus reduce interaction to a minimum. Although this is undoubtedly the correct thing to do there is the drawback that when high-frequency currents arrive at a sharp bend in the wire some energy is flicked off at the corner, just as in wired wireless, where a new wave is generated at a sharp corner and shot off into space.

The type of wire to use for wiring receivers is still a very debatable point, square-section wire being the fashion at the moment. The wires which offer the least resistance to high-frequency currents are those with the greatest surface area as compared with their cross section. This is because any point in the centre of

the wire offers a higher resistance to the passage of H.F. current than do points at or nearer the surface of the wire.

Litz and other similar wires have less high-frequency resistance than other types, but it is inadvisable to use Litz for wiring a receiver as one of the many insulated strands of which it is composed may break and thus increase its resistance up to that of ordinary wire.

Copper Strip

After Litz wire comes copper strip with its large surface area and small cross section; following this is square-section and round wire which are about equal in H.F. conductivity.

In conclusion it may be added that the perfect method of wiring even a simple one-valve receiver, without considering multi-valve and "super" sets, has yet to be discovered, and so there is plenty of scope for investigation in this direction.

G. H. D.

"Peace on Earth — Goodwill Towards Men"

WILL BROADCASTING BRING INTERNATIONAL UNDERSTANDING?

WHILE I sit here at my machine —with the headphones on my ears at almost five a.m.—I am listening to the new station at Atlantic City. With a slight twist of my controls I bring in K D K A on her three hundred odd metre wave. Another twist brings in a station giving a dance programme which I have not heard before; a twist again and I have a whistle on a wavelength which is usually blank. The next turn brings me to W G Y, who is so loud that I have to switch through to the loud-speaker.

Still More Stations

Progressing beyond the four hundred mark and using a little reaction, two more stations come in at good phone strength though morse interference has so far prevented my naming them.

Altogether during the night I have heard K D K A, on both wavelengths; W B Z, W B G, W G Y, W F Y, W J A J, and five stations which I could not name, giving enjoyable programmes.

What a feast! And it is not freak reception. Certainly I am using my own receiver, but it is obvious from the howls on their transmissions that a good many enthusiasts are getting some of these stations.

Let us cast our minds back to the situation two years ago. The contrast is staggering. In those days the ordinary enthusiast imagined that he ought to have his name enrolled upon a roll of honour if he built a receiver capable of bringing in the U.S.A. stations.

Exception Rather than Rule

Now it is the exception rather than the rule for a man to own a receiver which will not bring in at least one of these stations occasionally.

And what a tremendous effect it is all having upon the general outlook of the man in the street. What a tremendous effect it is having upon the character of your boy who comes home from school and starts playing about with a few yards of wire until he manages

to receive music from the nearest broadcasting station.

The effect upon the man in the street is obvious.

The effect upon the boy at school is less obvious. It is possible that in many cases the gravity of this side of wireless is being overlooked.

What happens when your boy, having erected a few feet of wire in the back garden, experimented for weeks with a motley apparatus, suddenly constructs a circuit which brings him in a distant station?

Wireless has made a convert. That boy may later invent a means of eliminating atmospherics—and all this in his spare time.

But there is a deeper meaning of the thing.

What School is For

Everyone knows that school is but a training ground where the brain is instructed in the best method of obtaining knowledge, whereas knowledge itself comes later in the University of the World.

"Wireless as an Educational Factor."

The inverted commas are my own, but can't you see the headline in a wireless paper of the weekly type? One can imagine a microphone set in a studio with a professor giving a talk, perhaps, on the art of mastering the intricacies of Euclid—and giving it just as a schoolmaster would give it during school hours.

Excellent stuff, no doubt, and worth while even if only one half per cent. can be persuaded to listen to it. But it misses the point.

This is not how wireless educates. Take another picture. Let us imagine President Coolidge speaking into a telephone set on a table in his own home, the line being connected to a broadcasting studio whence the speech is radiated through the ether to a small aerial in a back garden of a suburban red brick villa somewhere not a thousand miles from London.

At the end of that aerial, twiddling knobs, is a sturdy, red-cheeked youngster just like your own. He is listening with bated breath to

the mysterious words which have traversed thousands of miles of space in less time than it takes him to switch off his filaments.

The romance of wireless is dead, perhaps, to you. Your adult mind has got used to it. But in the heart of your boy it lives, flourishes. Words which he would take no notice of were they delivered in a school room he will absorb eagerly because they come by wireless.

What is he learning?

Other Places—Other Ideals

He is learning, of course, something about whatever subject President Coolidge happens to be discussing. But he is learning more, far more than that. He is realising that the world does not end outside his own town limits or, even, where England ends.

He is growing up with the fixed idea that all men, of whatever nationality, are his brothers. That they live very much as he does. He is learning, perhaps, the rudiments of a foreign language and acquiring a knowledge of the customs of other peoples which will enable him later in life to develop a "poise" which many of the older generation will envy him.

He is forming character and moral strength, and wireless is slowly, steadily, fulfilling its purpose in our lives.

Bridging Vast Distances

It is not in the power it possesses to bring the greatest of music into the humblest of homes that wireless fulfils this purpose; not in its ability to enable everyone to listen to the greatest authorities on any given subject without leaving their arm-chairs; not in its linking up of countless millions of British homes, but in its bridging of vast distances and its contempt of geographical boundaries.

And so, fathers—mothers—remember the words of the immortal Aristotle which, paraphrased, may read:

"A man makes the best use of his life during his spare-time."

E. C. D.

JOKING APART

:: The Christmas Radio Spirit:
:: Trouble in the Home: The
:: Lazy Burglar: At the Play:
:: Bathroom Jerks.

by F.W. THOMAS, the "Star" Humourist

WELL, seeing that it's Christmas and all that sort of thing, I don't mind if I do. But only a spot, mind! Just a teeny—

Fsszztgurglegurgleplopfsszzt! Whoa! Not ALL the soda.

And here's all the best to everybody, not even forgetting the black-hearted scoundrel two doors down the road, who spends his evenings trying to get Madrid or Pernambuco, and only succeeds, after all, in getting my goat.

Here's hoping that Father Christmas doesn't get caught in the aerial glug-glug-glug, and may you have to bend the oven to get the bird in glug-glug-glug.

And now, while we are on the subject of peace and good will, have you noticed what a wonderful influence radio has in the home? How it brings peace and joy into the house, when pain and anguish wring the brow? How it binds us together in a beautiful bond of brotherly and sisterly love?

Oh, my jah friends, it's wonderful! For instance:

I went round to old Wurzle's the other evening, and it was really delightful to see that usually peaceful family all pulling and pushing and scrapping round the set, like wasps round a jam-pot.

For father said he wanted to get Manchester, And mother thought she'd rather play at whist;

While George was all for Bradford, And Tom thought Robert Radford Was the only decent singer on the list.

Young Archibald was crying out for Sheffield,

But Algernon thought Sheffield was a bore;

The twins demanded Birmingham, From that there was no turning 'em, While Uncle Bert preferred the Selma Four.

Then Aunt Selina came and joined the party

And for a time the family troubles ceased;

Till she asked them to oblige her With a solo from Elijah,

A Spinning Song and someone's Chanson Triste.

But dear old Uncle Bill had other notions, He thought he'd like to hear a little play;

And begged them very hard, if They could, to get him Cardiff, Or a talk about the people of Malay.



"Ter-unk Hupwards—JERK!"
(From an old bath-water colour.)

So father changed his mind and tried for Plymouth,

But mother thinks that opera's far from grand;

For Wagner's stuff annoys her, She just detests *Tannhäuser*, And much prefers a military band.

Then brother Clarence ventured the opinion

That Leeds was much too lovely to be missed;

But Cousin John's fiancée Said the programme down for Swansea

Was the nicest bunch of music on the list.

But Faust is not a bit to Granny's liking;

She loves the Children's Hour and Uncle Jeff,

"And for goodness' sake don't bore us

"With that noisy Soldiers' Chorus; I'd sooner hear the Melody in F."

So they wrestled with the little knobs and handles,

And made it shriek, and oscillate, and moan;

Till the nephews and the nieces Pulled the whole darn set to pieces, And we had to fall back on the gramophone!

Not only does radio bring into the home this fine feeling of peace on earth and brotherly love, but as an elevating and educational influence its value can hardly be over-estimated.

Consider the little ones, how it improves their minds. Only last week I went into a neighbour's house, where I found little Clarence and his sister Ermyntrude locked in a fond embrace. Clarence had his hands full of his sister's back hair, while she, in return, had taken a firm grip of his offside ear and was twisting it and twisting it as if she were trying to get Chicago.

Having sorted them out, I demanded the wheretofore of these things, and was told that Clarence had been floundering up to his neck in homework, when the gentle Ermyntrude insisted upon turning on the loud-speaker. They had a 16-h.p. set with a voice like unto the bull of Bashan, only worse and more knobbly.

The result of this mixture is beautifully illustrated in the following extract from Clarence's homework, labelled

JOGRAPHY.

England is bounded on the East by the North Sea and on the South by the English Channel copyrite by royer the press association exchange telegraph and sentral news. The climate is of the temprit kind, with a anti-siclone over the azores and several secondries in the atlantick. weather will be colder than of late with some rain in parts. The principle exports of England are Percy Scholes from Newcastle, and the Royal Air Force Band which plays "For ever and four ever" in a monerstry garden. The capital of england is 2 L O and if Mr. Dan Godfry isn't the lord mayor then he ought to be.

I believe he got full marks for that, but I shouldn't like to say where.

Again, if further proof be needed

of how Radio is wrecking our home life, let me draw your attention to the following pathetic letter which I recently received from a poor heart-broken woman in Wigan:

Dear Sir don't you think it is time something was done about this wireless stuff which is ruining the industry of the country because a few weeks ago my husband who is a burglar by profession busted into a house and pinched a three-valve set and now he has stuck it up in the house and sits indoors listening to the music and stuff when he ought to be going out and getting on with his burgling and trying to make an honest living but owing to his idle habits we are reduced to abject poverty and I don't know how to make both ends meet or even one end meet and the other end potatoes and when I say to him why don't you go out and do some burgling you idle good for nothing loafer he only says hush my dear I am listening to Mr. D. Groot and hour after hour he sits there beating time with his jemmy while I have to go out charing to pay the rent dear sir can't you do something about it yours truly Emma Psyches hoping this finds you as it leaves me at present.

And talking of the drama, which we weren't but we're going to now, so please don't argue. Talking of the drama, we've been hearing of late an awful lot of nonsense about wireless plays and getting the scent of the new-mown hay through the microphone.

"Turn out the lights," say the experts. "Turn out the lights, sit in the gloaming by the flickering fire, turn on your imagination, and you will be able to conjure up the scene, to bring the whole thing vividly before you."

Well, I ask you!

They're all very well, these wireless plays like *The Midsummer Night's Dream* and *Radio and Juliet*, but some-

how they don't seem to get across. They lack just that little touch which would give an air of verisimilitude to an otherwise bald and unconvincing how-d'ye-do. You see what I'm driving at?

For instance!

The other evening I was listening to a play by a man named—a Johnny named—a writer named Jake-Something-or-other. Jake Jake Jake, I've got it on the tip of my tongue. . . . Or was it Shake? Ah, yes! Of course! Shake-Shake-Shakespeare. That's the chap! You've probably heard of him.

Quite good it was, too! Oh, quite! That man will go far, I shouldn't wonder. He ought to be encouraged. But do you know, I could hear every jolly old word of it. Every word. There wasn't a sound. And I said to myself, this is absurd. The people who arranged this stunt ought to know better. They can never have been to a real theatre.

Because to get the real effect there should have been a girl sitting behind me, crunching hard-core chocolates and dropping the box, and crawling about among my feet to pick them up, and rattling her Dorothy bag, and asking her friend if she could see, and wondering if George would remember to put the cat out, and tickling the back of my neck with her programme.

And on my left there should have been a man who had eaten too many salt shrimps for his tea, a man who would keep jumping up and treading

stood up to arrange their wraps, thus blotting out three parts of the stage for at least ten minutes while they said "You sit here, dear! No, you sit here! No, you! But I'm quite comfortable. I am really. I can see perfectly. Are you sure? No, have one of these. Oh, do! They're coffee inside. But really, I couldn't! I've eaten such a lot of dinner. Yes, I'm afraid we've missed quite a lump, but it doesn't matter much because I remember I saw this same piece twelve years ago at Bungay. Or was it thirteen? Yes, I recollect now. It was the year after Walter's brother fell down the coal hole and lost his memory, and then he goes and marries that silly red-headed woman; but you know, my dear, it was his money she was after. Don't tell me! The brazen hussy. But you see, my dear, this man, the one that's talking now; he's supposed to be in love with the parlour maid who is really the hero in disguise, and the maid is in love with the second footman who is really the hero's step father. . . . Or am I thinking of something else? Why, yes, of course! That was a piece we saw at Eastbourne, the year that Egbert had the mumps. I remember now. It was called *Did She Fall, or Was She Pushed?*

And I know I cried and cried. So this must be something else. But I daresay we shall be able to pick up the thread of it presently. I expect that's the villain talking, don't you? Because he's smoking a cigarette and curling his moustache. Villains usually smoke, you know, to show that they don't care, and I do wish you'd lend me your powder puff, dear. I've left mine on the sideboard,

and I'm certain my nose is as shiny as a bladder of lard."

And so on and on and on and on. And so on.

Well, you know, I missed that sort of thing. The show didn't seem complete without something of the kind



"Asleep in the Deep" (showing what you've missed). F.W.T. will illustrate his articles!

on my toes and saying, "Sorry and all that, what?" and going out to see a man about a dog between the acts, and coming back smelling of petrol.

And in front of me a couple of women who had come in late, who

Another "Joking Apart" Article by F. W. Thomas

and I went to bed feeling as if I'd been swindled and wanting my money back.

And the same thing applies to Grand Opera.

What is the good of sitting down in a comfortable arm-chair, with your feet on the mantel-piece, and a glass of the mixture as before by your elbow, and a good old fruity pipe going strong, and being able to hear every note, without the slightest interruption?

That, my friends, is not Grand Opera.

Nononono! Not so, but far otherwise!

I want to hear the man behind me humming the "Toreador's Song," just to acquaint everybody with the fact that he's heard it before and has got a good ear for music. I want to hear the idiotic female on my left beating time to the "Soldiers' Chorus" with her umbrella, and telling her friend that she heard that last year, down at Brighton, on a street organ, with the duckiest little monkey sitting on top that ever you saw with a little blue coat and brass buttons and tiny wee red trousers eating a banana.

It is all very well to give us the whisper of the wind, the murmur of the waves, and the crash of the thunderous storm; but I want to hear those other Noises Without; the whisper of the woman on my left, the murmur of the female person behind, and the thunder of the man with the thirst, treading on my hat.

And here's another little thing that I have my doubts about. I am told that very shortly the B.B.C. is going to broadcast a series of talks on Physical Jerks, instructions which we shall follow every morning, with the object of reducing our embonp-wong, and improving the contours of our old oak chests, etc.

Well, that's all very nice. But consider!

I don't like loud-speakers. I prefer the phones. So in view of this feature I have had a wire run upstairs to my bath-room, where I can stick the things on my head, and in response to the commands from Daventry, perform the usual antics,

of tripe. (You know what drill sergeants are when they get worked up. Very well, then.)

Let us assume that I am throwing my weight about, and doing "Ter-un-k Hinwards—BEND!" and I hinwards bend it too much, and the bath-room comes unstuck; what about it? How am I going to explain matters to the lady next door, and the police?

No, sir! No radio jerks for me.

The houses we live in nowadays won't stand it. Why, look at poor old Witherspoon. Poor old Witherspoon recently moved into a brand new villa in Brickston. Awfully jolly little place, providing you didn't cough in the hall, or hang up your hat before the mortar was dry.

Witherspoon was going out one day with his dog, and he forgot something, and went back for it. But

instead of taking his dog indoors with him, he tied him on to the handle of the front door. And a cat went by. And the dog went after the cat. After which there wasn't any more house, but only a cloud of dust proceeding up the street at seventeen m.p.h.

But talking of bath-rooms, you've missed a treat. The people at 2LO having heard about my vocal gifts, recently begged me to sing to you all. Yes, they did! But I pointed out that the only time when I was really and truly in good voice was when I was in my bath. I suggested therefore, that if they would get value for money they should rig up a bath in the studio, with a lump of soap, and a nice tickly brush; and then—

But they wouldn't, and so I shan't, and therefore you won't. Which is that.

Oh, yes! I nearly forgot. A jolly good umpteen candle-power seven-valve grid-bias super-retro-auto-sonic-reflex Christmas to you!

NOT A CHRISTMAS TREE—



—but a valve-tester's rack!

such as Knees Firm, Hips Outward—Bend. One, two! One, two! And so on.

Now a few weeks ago I was at Rumbelow's place, listening to a most entertaining talk on "The Atom and How to Rear it." And we were both wearing headphones. And Rumbelow, I remember, was expecting an important letter from his wife, telling him whether she was coming back or not. And in the middle of the lecture the postman rat-tatted at the door. And Rumbelow was so eager to hear the verdict that he rushed to the door, but forgot to remove his headphones. With the result that he pulled the side of the house clean out by the roots, and I got an awful cold sitting in the draught that came through the hole.

Well now, let us assume that I am in my bath room, clad for the most part in goose-pimples. And let us assume that the Radio Drill Sergeant is going it rather. Urging me to put some beef into it, and not stand there looking about as intelligent as a yard

A SET FOR YOUR LADY FRIENDS

Details of a Single-valve Set that is Simple to Operate.



It is hoped that the fair sex will not infer that their men friends have a poor opinion of their mental ability if it is stated that a wireless set built specially for women must be made as simple as possible.

Saving Trouble

Should any lady read this article (and who does not read THE WIRELESS MAGAZINE?) she may take it that the sole object of the receiver described here is to save the user trouble. And what better object can man have than to save woman trouble?

To proceed, a trouble-saving wireless set must embody the following features: (a) It must have only one tuning control; (b) the attachment of telephones must make the set operate, while their detachment should put it out of action; (c) it must be absolutely reliable; (d) it must not cause other people interference through oscillation; (e) the changing of batteries must be simple and foolproof, and (f) danger from lightning must be avoided as far as possible.

Broadcast Receivers

In addition to the above, and this applies to all broadcast wireless receivers, it should be attractive in appearance, dust-proof and reasonably compact.

To secure these ends, only the best and most reliable components must be used, and in

the following list are those actually used in making the set described: Radion mahogany panel, 6 in. by 8 in. by $\frac{3}{16}$ in. (American Hard Rubber Co.).

- .0003-microfarad fixed condenser (Edison Bell).
- 2-megohm leak (Edison Bell).
- .002-microfarad fixed condenser (Igranic-Freshman).
- 3 single coil holders (two with flanged bases).
- 1 coil short-circuiting plug.
- 1 valve-holder, standard pattern.
- 2 W.O. terminals.
- 3 Igranic coils, Nos. 35, 50 and 200.
- 1 Cossor Wuncell valve.
- 1 2-volt Oldham portable accumulator.
- Burndy Super Radio H.T. battery.

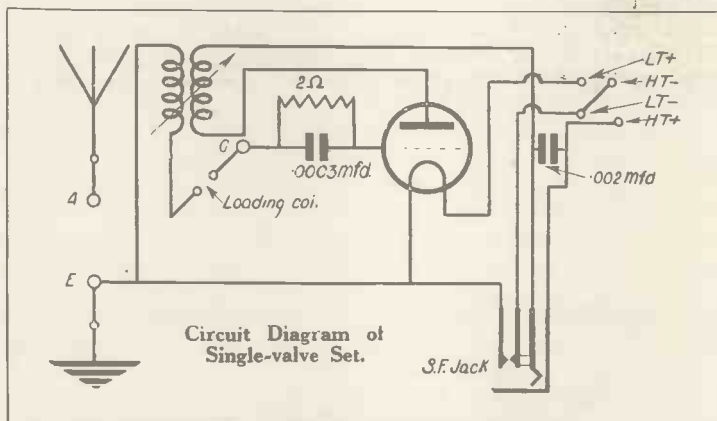
Brown Feather-weight telephones.
Base of an old valve.
The cabinet is one of standard size, made by E. B. Wright of 82 Farringdon St., E.C.2.

Special Points

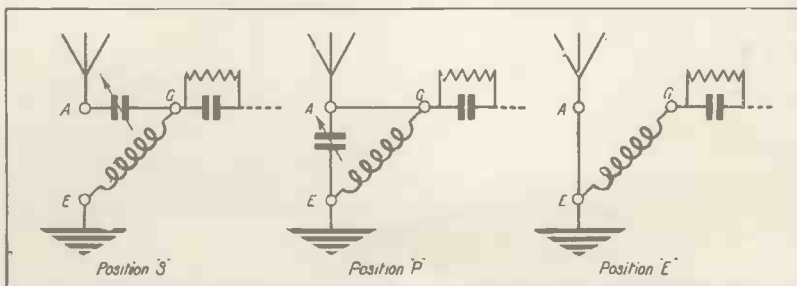
Before proceeding with the construction there are one or two points regarding the general arrangement which call for attention. First with regard to the valve-holder shown on the top of the panel. This is for the connection of the batteries.

The latter are wired to the base of a broken valve and, by plugging this into the valve-holder, all connections are automatically made.

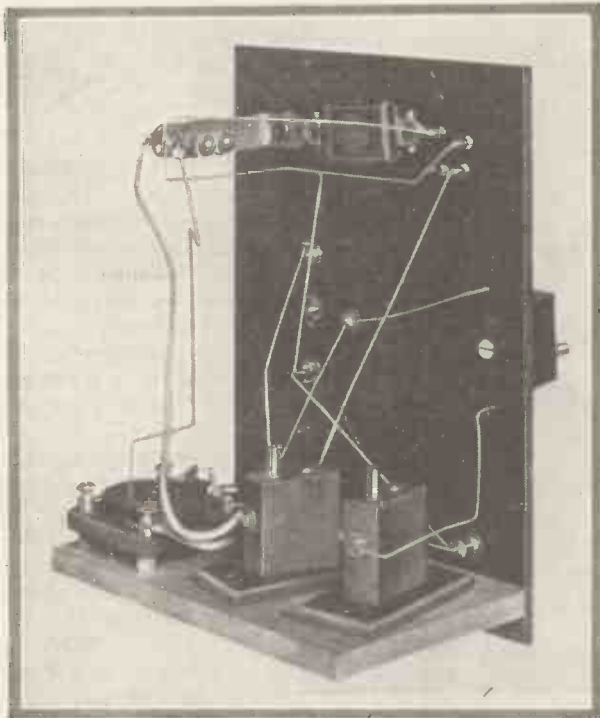
Secondly, regarding the tuning, the latest pattern Dial-o-denser, with its neat switching device, will be found very use-



Switched Dial-o-denser (Portable Utilities Co.).
Elwell Jack, type S.F. and plug to fit.
Anti-microphonic valve-holder (Peto-Scott Co.).



Diagrams showing Circuit with Dial-o-denser Switch in Different Positions.



Rear View of Lady's Single-valve Set.



Another View showing Valve and Coils in Position.

ful in fulfilling the one-control idea.

Below the Dial-o-denser itself is a moulded disc, which can be rotated: while below this disc is another one, bevelled, bearing the letters S, P, and E at three points round its circumference.

Switching

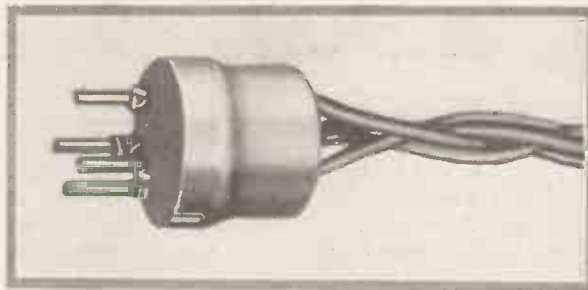
Bringing a white mark on the rotating disc against letter S on the lower one puts the condenser in series; putting the mark against letter P puts it in parallel, while when the mark is against letter E, the aerial and earth are short-circuited and the set disconnected at the aerial side. Thus is the set protected from lightning effects.

Only three connections to the Dial-o-denser are necessary, and these take the form of projecting studs at the rear. The connections which are made within the Dial-o-denser are shown by the diagram.

It will be seen from the circuit diagram that the only connection from the aerial is made to stud A on the Dial-o-denser. All the other connections are within the instrument itself. A point to note is the manner of making connections to the valve holder to which the bat-

teries are wired. The normal anode valve socket is H.T. +, the grid is L.T. +, and the filament sockets are L.T. - and H.T. -. The two latter sockets are wired together below the panel.

A general idea of the panel layout from the front can be gathered from the view of the finished instrument. Every effort has been made to make the set symmetrical, and at the same time convenience in handling has not been forgotten.



Details of Battery Plug for Single-valve Set.

Thus the aerial and earth terminals are well to the left, the loading-coil plug out of the way at the rear. The condenser knob and plug socket are at the front, where wanted during listening, while the battery socket is at the rear where the wires will be out of the way.

From the layout may be gathered the actual disposition of the holes in

the panel, all the necessary dimensions being shown. A $\frac{5}{32}$ -in. drill will be found suitable for all holes with the exception of that for the jack, which requires one of $\frac{7}{16}$ in. If no drill of the latter size is available, the tang of a file may be used to enlarge a hole made by a smaller-sized drill.

Panel and Support

The wooden support at right angles with the panel is $3\frac{1}{2}$ in. wide and 6 in. long. It is secured to the panel by three screws equally spaced along a line $\frac{1}{8}$ in. from the left-hand side. On this board are mounted the grid condenser and leak, the coil-holders and valve-holder. These details may be seen in the photographs with the exception of the combined condenser and leak, which is disposed immediately behind the valve-holder.

In order to secure the shortest possible lead to the grid connection the valve holder is located in such a position relative to the grid condenser that the grid terminal comes next to the left-hand terminal of the grid condenser.

The relative positions of the coil-holders are important. The aerial coil-holder, which is the right-hand

one in the back-of-panel photographs, should be fixed approximately at the angle shown. It may be screwed down at both ends. The reaction coil-holder, however, must be capable of movement round its rear screw hole until the set has been tested. In order to give it this movement one corner of the rear of the coil-holder is rounded off with a file.

Position of Jack

In the photographs also can be seen the manner in which the jack is placed. It will be seen that that portion of the frame at right angles with the panel faces the nearest panel edge. This allows just sufficient room for the Igranic-Freshman condenser to be soldered into place between the H.T. positive terminal and the frame of the jack. In this manner is that condenser connected across the telephones.

Wiring

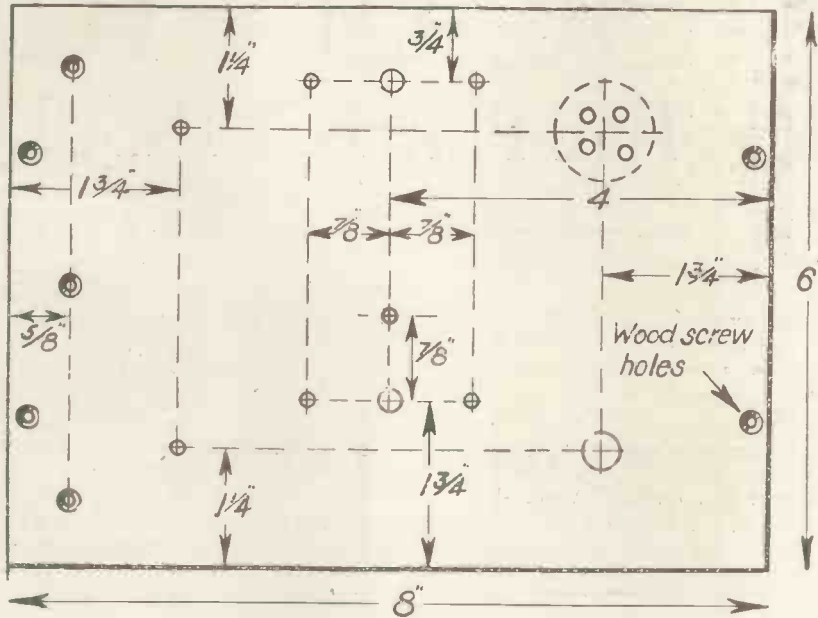
Wiring is carried out with No. 18-gauge bare tinned-copper wire with the exception of the leads to the reaction coil-holder, which are made of rubber-covered flex. It may be necessary to change these leads over after wiring, for the reaction may inadvertently have been reversed.

All that now remains is the making of the battery plug. This point is illustrated in one of the photographs.

It is the base of a burnt-out valve, the bulb and foot-tube having been knocked away. Four flexible leads are brought through from the front and taken to the legs, where they are soldered. The whole of the interior of the base is then filled in with Chatterton's com-

pound which, when set, forms a very secure anchorage and prevents any possibility of an internal short-circuit.

should be used, and the recipient of the set should be instructed as to the battery terminals to which the leads should be joined.



Layout of Lady's Panel for Single-valve Set.

Testing

The set should be tested before being screwed down in its cabinet. While on test the setting of the reaction coil may be made and the adjustment should be such that reaction is insufficient for the set to oscillate, but at the same time gives greatest signal strength without distortion. If possible, it is best to make this adjustment on the actual aerial on which the set

The final operations are to plait the leads and to cut short the anode

is permanently to be worked.

For working more than one pair of telephones, either a double plug may be used or a single plug may be wired to a distribution board in the usual way.

R. B. H.



View of Lady's Single-valve Set Completed.

"HEARING is believing," says a wireless slogan. Never again, therefore, need the faith of the married man be questioned.

We understand that there is no truth in the rumour that the B.B.C. is forming a League of Newspaper Readers.

With wireless sets installed in nearly every workhouse, the average taxpayer has at least one good thing to look forward to.

It has been suggested that a series of technical lectures should be given by wireless to taxi-drivers. Especially on the question of over-charging.

Politicians say they have mingled opinions as to the value of wireless. It is only fair to add, of course, that wireless enthusiasts have mingled opinions of politicians.



(Above).—A simple outfit for casting sulphur, consisting of an enamelled mug, a sheet of mica, and a spirit lamp.

SULPHUR

THE PERFECT INSULATOR

An article written in praise of the ideal insulating substance for the research worker—By Dr. E. E. FOURNIER d'ALBE.

(Right).—A porcelain dish of sulphur, a pure form of this element obtained by the condensation of sulphur vapour.



AS an insulator sulphur has only two rivals—porcelain and amber. Porcelain is variable in its properties, and cannot be moulded or worked by the amateur. Amber can, but amber is almost worth its weight in gold.

Sulphur is both pure and cheap. It is easily cast into any shape at a low temperature. It is light and sufficiently tough to stand any ordinary handling.

It is rather harder than chalk, and stronger than plaster. It can be filed, sawn, and drilled with ordinary tools, and turned in the lathe. It takes a beautiful polish and has a delicate and pleasing greenish-yellow colour.

Unlike earthenware, it does not absorb moisture from the air. Its insulating properties do not suffer in a damp atmosphere.

Unlike paraffin wax, it does not allow an electric charge to "creep" over its surface.

Why Not Use It?

In physical experiments requiring extreme insulation—as in researches on radio-activity—no physicist would dream of using anything but sulphur insulation, unless, indeed, he is wealthy enough to afford amber.

And why should he use amber, when he can fix a pin, a nail, or a screw in sulphur by simply heating it and pressing it in?

Ebonite is a splendid material, and pleasant to work with, and those manufacturers who have made it good for wireless purposes deserve our gratitude.

But, when it comes to real insulation, give me sulphur!

A gold-leaf electroscope mounted on sulphur will remain charged for days, until, indeed, the natural ionisation of the air discharges it.

The resistance of a centimetre cube of crystalline sulphur, even well above blood-heat, is over a thousand million megohms!

How to Use It

Sulphur is best cast from melted "flowers of sulphur," which are not contaminated by arsenic, as most block sulphur or "brimstone" is.

The sulphur is heated in an enamelled iron mug or similar vessel over a spirit lamp. It should be heated slowly and covered with a sheet of glass or mica, as rapid heating leads to evaporation, and sulphur vapour is not pleasant.

A brownish clear liquid is soon formed, and this is cast into moulds of wood or cardboard.

In preparing a panel for wireless purposes, any ordinary wood may be used if plugged with sulphur.

Drill holes in the wood wherever insulated screws or attachments are to go, stick paper over one end, and pour the sulphur into the hole through a paper funnel or down a cardboard "chute."

Scrape off the superfluous sulphur with a knife before it is quite solid.

The hole may be countersunk for greater security at both ends, but as a rule the natural roughness of the wood will hold the plug quite securely.

For some purposes, such as making insulating stands, it is useful to give a flange to the plug. This can

be done by fitting a wide washer over the hole when drilled.

A quick and easy way of mounting, say, a variable resistance, on three of such flanged plugs is to drive three panel pins into the base of it, or to screw in three small screws, heating them slightly, and just pressing them into the sulphur.

Once they are engulfed they give a firm and steady hold.

In any case, it is possible to drive nails into sulphur plugs or to tap holes for screws. Hammering is, of course, best done while the sulphur is still hot.

Special care must always be taken not to overheat the sulphur, as this is liable to produce "allotropic" forms of sulphur, some of which are about 100,000 times more conducting, though even then they insulate as well as many varieties of glass.

General Properties

Sulphur melts at 115°C., and boils at 445°C. It burns with a blue flame, which is difficult to extinguish, owing to its low temperature.

Its combustion produces sulphurous anhydride, SO₂, a powerful germicide and disinfectant. The specific gravity of sulphur is 2.

The only advantage that ebonite possesses over sulphur is its greater toughness. If sulphur could be toughened by some admixture it might form a very useful substitute for ebonite.

Here is a field of research for the amateur desirous of making a mark in wireless progress, and endowed with the necessary patience.

The Christmas Fox-trot to Broadcast Music

Few dances can be more charming than those little intimate home affairs that are held during the Christmas holiday. Nowadays they are better than ever before, thanks to broadcasting, which brings the best dance music and orchestras in the world right into our homes.

In this article SANTOS CASANI, whose dancing lessons broadcast from 2 LO have been such a success, and who is one of the leading authorities on modern ball-room dancing, gives useful hints on dancing in general, and on the "1926 fox-trot" in particular, for the benefit of readers of THE WIRELESS MAGAZINE.



Mr. Santos Casani dancing with Miss José Lennard.

"WHAT is dancing?" is a question asked by many people, and the best answer is: Dancing is walking gracefully to music with rhythm. (Rhythm is the accented time making "one accent, one step" and gliding on to the others.)

Appearance

Appearance plays a large part in dancing. However well a man can dance, he has the appearance of a bad dancer if he holds himself badly, but if he holds himself well it will go a long way towards giving him the look of a good dancer, even if he is not one.

To look well the body must be held naturally straight but not stiff, and naturally slack but not uncontrolled. The head should be upright and pointing straight forward.

The "indication" is given from the waist upwards, and the movement from the waist downwards. The knees should not be bent more than in walking, but, on the other hand, must not be stiff.

The man's right hand should hold the girl just below the shoulder-blade, his left hand should rest on the girl's right, and her thumb should close over his; their arms should be at equal distances from their shoulders, not with one pulling back. The man's elbows should be in a straight line with each other.

The dancers' bodies should touch just above the waist, but with the

top parts of the bodies held away from each other. If the top parts of their bodies touch, the girl will fall on the man when he turns, causing an ungraceful movement. The legs should move from the hips and *not* from the knees.

The knowledge that a couple are holding themselves well and look neat will help them to dance well.

The fox-trot is danced in a three time, rather than four. The best way to explain this is to say that the first step is slightly longer and more definite and takes two beats, while the other two steps follow more quickly.

The first thing to learn in the fox-trot, when knowing how to walk, is the open turn. First of all, what is a turn? A turn is a complete circle; when walking one way the dancer turns right round and faces the same way again.

It is called an open turn because

the feet should pass as near together as possible; they should not close. This turn is done in six steps, the "indication" being given on the first and fourth steps.

In three steps the couple should have made half a turn, and the fourth step begins to bring them back to the original position. While turning they must progress at the same time.

How to Do the Open Turn

This is how the open turn is done: To start with, the feet should be straight and close together. The first step turning to the right is done with the right foot.

1st step:—Advance right foot, at the same time turning it to the right; the shoulders must also turn, the left shoulder being brought forward and the right back.

2nd step:—Bring left foot parallel with the right, turning on both

Mr. Santos Casani giving his first broadcast dancing lesson at 2 LO.



The Christmas Fox-trot to Broadcast Music (Continued)

feet so as to be a quarter way round.

3rd step:—Right foot is taken straight back, passing close to left.

4th step:—The left foot is taken back, passing close to the right foot, the foot turning inwards and the body turning at the same time to the right.

5th step:—The right foot is taken round to the first position as the left foot straightens up.

6th step:—The left foot comes straight forward, passing close to the right foot.

The same turn can be done to the left, starting with the left foot and turning to the left.

There is also a closed turn to the left. The first four steps are exactly the same as the open turn, but on the fifth step the left foot is brought to the heel of the right foot, and the right foot closes up to the left on the sixth step to allow the girl to cross.

The "wave" can start from either the first half of the right-hand turn or first half of the left, and end with either the second half of the right- or left-hand turn. It is done backwards, turning to either side, taking three steps each way.

From the first half of the right-hand turn three steps are taken to the left, beginning with the left foot and turning the body at the same time. When the left foot is back the next steps are taken to the right, beginning with the right foot and turning the body at the same time. If the turn is completed here, it will finish with the second half of the right-hand turn, but if the wave is continued again to the left and the turn completed, it will finish with the second half of the left-hand turn.

The "feather" step is taken from the walk, and is done to the side of the girl. A definite forward step is taken with the right foot, the next step is taken with the

left foot to the side of the girl, and, as the weight is transferred from the right to the left foot, the right foot is raised slightly off the ground, this movement forcing the girl a little to the side. The right



Rapture!

By courtesy of the General Electric Co., Ltd.

foot then comes outside the girl, and a step is taken with the left foot towards her and the ordinary walk continued.

But the "feather" step can be followed by the left-hand turn. After the first three steps, instead of taking a step with the left foot towards the girl and continuing the walk, the left-hand turn, beginning with the left foot, is done instead.

BOURNEMOUTH'S talk on pottery was doubtless for the benefit of the rheumatically old gentlemen who spend their time pottering about there.

RIPPLES

ONE station gives a rather dry talk on science from 9.40 p.m. to 10 p.m. This fits in very nicely with the arrangements of those listeners who like to slip "round the corner" before closing time.

"WINE, women and song," was one of the items recently broadcast from 2 L.O. It looks as though that particular programme was arranged by one of our big Sunday newspapers.

WIRELESS can be used to bring political speeches within the hearing of everybody, says a well-known M.P. Still, it ought to continue to prosper despite this obvious drawback.

WIRELESS detectives are employed in large numbers in U.S.A. Evidently they regard oscillators just the same as any other criminal.

A B.B.C. writer says that the English of a certain Continental announcer is distinctly refreshing. But not so refreshing as Scotch.

SPEAKING of a recent Spanish programme, a listener said it brought tears to his eyes. It sounds more as though he had picked up Spanish onions.

"OUR work during sleep" was the title of a recent 5IT talk. We understand the sole performing rights are held by the Bricklayers' Union.

PROFESSOR Low says that to the man of the future we shall appear as ignorant savages. But is it quite fair to class us all as oscillators?

ACCORDING to scientists, wireless may give us another sense. There are some wireless experimenters who can do with it.

AMERICANS are concentrating on the manufacture of hornless loud-speakers. All the horn in that country being required, presumably, for the manufacture of spectacle rims.

EXCERPTS from history are proving very popular amongst American listeners. Well, they have to make the most of what little they have.

THE recent broadcasting of a play in Yorkshire dialect makes the claims of the Esperanto advocates stronger than ever. Nobody can now deny that a universally understandable language is needed.

Are You a Good Listener? :: An Article by H. Toplis

HOW many listeners know how to listen? This is a serious question and must be treated seriously. As a glaring example of a listener who knows not how to listen, let us take a lady of my acquaintance.

* * * * *

ACT I.

SCENE 1.—The Loud-speaker Drawing-room.

TIME.—Sunday, 5.5 p.m.

Dramatis personæ :—

- The Writer.
- His Daughter, aged 7.
- 17 Dolls.
- 1 Teddy Bear, etc. etc.

Daughter : Daddie! Daddie! Children's Hour! Children's Hour! I am sure it is five o'clock.

The Writer : What is the use of putting on the Children's Hour? You don't listen to it!

Daughter : I do! I do listen! Please put it on—Gladys wants to hear it! (*Gladys is one of the seventeen dolls.*)

The Writer : Oh, all right! All right! (*Twirls condensers and gets Children's Hour.*)

[*Curtain.*]

SCENE 2.—The Same.

TIME—5.15 p.m.

The seventeen dolls and the one Teddy Bear are grouped round the loud-speaker. The young lady is in a corner reading the last instalment of "The Bruin Bears" (free balloon given with this week's issue).

The loud-speaker loses volume, mainly owing to the writer disconnecting the accumulator leads.

(*Silence for several minutes.*)

[*Curtain.*]

SCENE 3.—The Same.

TIME—5.25 p.m.

Daughter : O-o-o-o-h!—o-o-o-o-h!—you've switched it off, and Gladys wanted to hear the Children's Hour, she likes hearing it from Aberdeen.

[*Curtain.*]

* * * * *

Now let us consider the case of Mrs. Bass, Junior. Mrs. Bass, Junior, has, let us say, been paying us a visit. Tea is finished and conversation has languished to a subdued mumble, largely due to crumpets.

One is able to read the paper in

spasmodic syncopated periods until the Blow—the Expected Blow falls.

"Dear!" says your wife, with a hunted look in her eyes, "perhaps Mrs. Bass would like to hear the wireless."

Mrs. Bass would—you knew quite well she would. She has heard *such* a lot about your set, she was *really* anxious to hear it, and *what* a pretty loud-speaker. So, using up all your available low-tension and high-tension volts, you switch on.

It may be a Symphony in E minor, or a Scientific Talk by A major, but as soon as that speaker gets into stride the Tower of Babel is no longer a legend.

No! it is not the loud-speaker, it is Mrs. Bass, Junior. Her voice, which after tea had sunk into a numble of repletion due to crumpets, now takes on a clarion note.

Or perhaps, more accurately, let us call it a strident, martial noise.

Or, more correctly, a continuous cackle, a never-ending cackle, a desire, an anxious desire not to be beaten by a loud-speaker.

You listen to the loud-speaker with one ear and to Mrs. Bass, Junior, with the other.

Then with a savage jerk you break a connection and *both* the loud-speakers stop.

[*Curtain.*]

* * * * *

Mrs. B. is of course a terrible case, but there is a worse, there is a worse example by far. You invite Mr. Lionel Doings along to hear your set. It is a special programme and you are anxious to hear the Concerto for the Saxophone with Flatulent accompaniment.

You know Mr. Doings fairly well, so you give him a cigar and a little refreshment and all is well for a short time. Then he arises from his chair, and, carrying his glass with him, draws near to your apparatus, which blanches nervously.

"You ought to get K D R T on this set," he says. "I get it on a two-valver and this is a four," he remarks further.

At this point your wife goes out to the pictures.

She returns at 10.30 p.m. and is not surprised to find the table and

sideboard littered with the remains of a very fine four-valve set, and Mr. Doings just going home, with the promise 'hat he will send you a blueprint of his set to-morrow:

* * * * *

And there are many others like unto Mrs. B. and Mr. D.

Some listeners are so anxious to get the full value from their three nights for twopence that they listen night in, night out, for 365 nights in the year. They hear every item, and write weekly letters to the B.B.C. complaining that there is too much high-brow tripe and not enough really good music, and what about it?

Such individuals, used to go to the pictures and see the whole programme twice nightly. In this connection Broadcasting has undoubtedly benefited the Cinema.

* * * * *

Now this article has a title "Are You a Good Listener?" so destructive criticism must give way to constructive advice.

This advice may be tabulated as follows:—

1. The *will* to listen.

This is difficult, and requires long and painful practice, a suitable first exercise being to play snakes and ladders with your daughter, and listen-in, both being performed consecutively or concurrently as may be easier to the individual.

2. The *will* and *capacity* to believe that a wireless set is for the purpose of listening and not for *messaging* about.

3. The *appreciation* that programmes cannot please everyone at the same time, and in the same place.

4. The necessity for *relaxation* both physical and mental.

Such relaxation enables one to go to sleep when a particular enemy, be it high-brow or low-brow, makes its acoustical appearance.

5. The *knowledge* that even if one's set does not get K D G R, R S V P or Q O R 3, there is nothing to prevent our saying it does, as do the rest of our wireless friends.

YOU, YOUR SET and YOUR LANDLORD :: *The Legal Position Explained by a Barrister-at-Law*

THE Rent Restrictions Acts, besides securing for tenants all over the country safety from unreasonable disturbance by their landlords, confers upon many of them immunity from the campaign against wireless fixtures which seems to be proceeding in many parts of the country.

Landlords are getting hold of the idea—rightly or wrongly—that wireless aerials and supports are likely to be prejudicial to the safety of the property on which they are erected. Consequently the landlords who have this idea are insisting either on the removal of the fittings, or upon the tenant's paying a licence fee or taking out an additional insurance policy.

Importance of the Lease

Now the landlord cannot impose terms like these upon his tenant unless the lease gives him the right to do so. If the lease provides for insurance against all risks by the tenant, then the tenant must include in his policy whatever additional risk (if any) is incurred by setting up an aerial.

If the lease says that no erection may be made, or that no fixtures may be put up or no nails driven in, without the landlord's consent, then the landlord could prevent the tenant putting up an aerial, and might, on giving consent, impose a fee or some condition.

In the ordinary course a landlord who objected to wireless could, by terminating the tenancy, turn out a tenant who set up wireless apparatus. Under the Rent Act, however, a landlord cannot eject a tenant except under very special circumstances.

If the landlord wants the place for his own occupation, or if the tenant does not pay his rent, or if he breaks any condition of his tenancy or causes damage or creates a nuisance, he can be turned out, but not otherwise.

As far as wireless is concerned, then, the first two conditions above stated do not apply. As regards the third—breach of a condition of the tenancy—this has been already discussed.

Every tenant should examine

closely the terms of his lease or tenancy agreement, and see how far they apply. If they prohibit fixtures of such a kind as wireless apparatus, then the tenant must comply, otherwise he can be ejected and may be sued for damages if he

seen, may be ejected under the Rent Act.

Whether a wireless fixture could create a nuisance or annoyance is very doubtful. If the tenant of one house or tenement puts up an indoor or outdoor aerial across a passage way, or across a window which is used by neighbours or adjoining tenants, this would doubtless be a nuisance, and the landlord might insist on its removal and might also turn the tenant out.

But if the tenant is careful and does no damage, and does not break any term of his tenancy, it is difficult to see how the landlord can enforce an objection to wireless apparatus. He cannot eject, nor can he raise the rent (except as the Act allows, which most landlords have already done), nor can he sue the tenant.

Unless it is conclusively proved that a wireless fitting will be an undoubted source of danger to the property the landlord cannot cause a tenant's fittings to be removed. As soon, however, as damage is proved or committed, the landlord can sue for damages and could get an injunction prohibiting the continuance of the fitting.

Complying with Demands

Of course, where the Rent Act does not apply the unprotected tenant would be well advised to comply with any reasonable demands of his landlord; for the lease or tenancy has only to be put to an end in order to leave the tenant exposed to the inconvenience of eviction.

Where the tenant holds his house for a term of years (seven or fourteen, for instance) there would be no fear of eviction so long as no term of the lease was broken.

In the case of flats, the tenant must bear in mind that his tenancy only extends to the rooms actually occupied by him, and the landlord retains control of the roof and staircase.

Where a person occupies furnished rooms it would be unwise for him to put up anything which requires fastening to the wall, without the landlord's consent. Tenants of such rooms are not protected by the Rent Act.

Prompt Answers

BY

"THE WIRELESS MAGAZINE"
ADVICE BUREAU.

"I beg to thank you for your prompt answer to a previous question of mine, and would be much obliged if you could help me still further."

The above is an extract from the letter of a reader who availed himself of our **Free Advice Bureau**. Of course, we helped him still further. There is no limit to **Our Service**. Why don't you let our **Technical Staff** solve your problems? Their advice is both **Free** and **Prompt**.

All we ask you to do is to observe the following rules:

Ask one question at a time; write on one side of the paper only; attach to your query the coupon on page iii of the cover, and send it with a stamped addressed reply envelope, to: **The Editor, THE WIRELESS MAGAZINE, La Belle Sauvage, London, E.C.4.**

has occasioned any loss to the landlord.

In many cases a tenant has no lease or agreement, and then the matter has to be determined by custom or implied terms. The terms printed in the rent book will apply just as if they were formally agreed to, and it is always a term of every tenancy, written or not, that the tenant shall not do any damage or, as it is called in law, commit "waste."

If the tenant does any damage in fitting up his aerial he may not only be sued for this, but as we have

"DEAR SANDY CLAWS,—
 "Will you please bring me
 a paint box and a fairy doll for
 Crismas. I want one with
 yellow hare and please
 wrap her up so the soot
 won't get in coming
 down the chinnee.
 Could you come to-
 morow and say yes
 on the wireless, as
 I would love to
 hear you speak?
 "Your loving
 "BERYL."

So wrote last
 December one six-
 year-old maiden with
 a passionate mother-
 ing instinct for her
 doll family and a lively
 curiosity about the un-
 known Christmas benefac-
 tor who annually strews joy
 in childish lives.

The kiddies have written begging
 letters to Santa Claus every Christ-
 mas since the delightful legend
 began, but what strikes one in
 reading Beryl's naïve epistle is the
 matter-of-factness with which chil-
 dren have instantly adopted wireless
 into their lives.

A Miracle

To us older folk it can still hardly
 fail of being a miracle. But small
 boys and girls are no dreamers or
 marvellers. Of all folk, they are
 the most intensely practical.

As witness the tiny boy who,
 when taken into the garden to admire
 a particularly beautiful flower grown
 after great trouble, merely remarked
 with thrilled interest, "Daddy, who
 is that dahlia's father?"

Wireless a miracle to such a young
 inquirer? Oh no, merely an essen-
 tially practicable method of achiev-
 ing that long-sought thrill—hearing
 Santa Claus "speak."

I'm afraid I don't remember
 whether Father Christmas has ever
 spoken through the microphone dur-
 ing a Children's Hour; probably
 the B.B.C. can hardly have over-
 looked him. Anyway, though the
 Christmas programmes for this year
 are not available at the time of
 writing, I do hope this good fairy
 of Yuletide will figure among the
 "artistes" booked, and talk to the
 children as only he can.

And I hope, too, that one stunt
 programme towards the close of the
 year will "feature" the most thrilling



of all sounds to childish ears—the
 jingling bells of the sleigh that is
 drawn by reindeer, the soft scuffling
 of the historic chimney entrance, and
 the delightful rustle of parcels being
 stuffed into pillow-cases in the dark.

I doubt if there's any parent—or,
 indeed, any grown-up—who won't
 make a point of listening to that
 particular Christmas feature. For
 Father Christmas is everybody's
 property—the hero of those who
 impersonate him almost as much as
 of those who believe.

Christmas and broadcast—how
 well they go together! What a
 help, when the children are worn
 out with the long excitements of the
 day and tired to the point of quarrel-
 ling, to set the loud-speaker going
 and watch quiet and joyful soothing
 creep over the excited little faces.

Past Bedtime

It's well past bedtime, but there's
 no refusing the eternal plea to sit
 up later on this one day of the year;
 and with the help of the general
 programme, which the little ones
 enjoy almost as much as their own
 Hour, the last lap of Christmas
 passes happily and restfully without
 the tears of over-fatigue.

"When the loud-speaker sings,
 my thoughts sing inside me, too."
 So one child expressed the happy
 effect of broadcast music more
 prettily than she knew.

After Christmas come the parties,

thick and fast. And here, again,
 what a practical friend wireless is
 to the children, especially in
 these days of small houses
 which are too crowded to
 find room for pianos. A
 youngsters' party is
 shorn of half its glory
 without music on tap
 for games and danc-
 ing! That's where
 the loud-speaker
 comes in.

The Children's
 Hour first, and
 the general pro-
 gramme later, pro-
 vide music in plenty
 for all the times of
 a party that aren't
 filled with eating
 goodies or with romps
 which require only the
 accompaniment of hearty
 laughter and chattering voices.

A programme prepared beforehand
 is always advisable to quell that
 insistent, "What shall we do now?"
 which soon leads to boredom and
 quarrelling, and such a programme
 can be timed carefully so that the
 musical games played coincide with
 the musical moments of the loud-
 speaker.

Musical Chairs

No games are more popular among
 the small fry than musical chairs
 and its simpler variant, musical
 bumps.

These games, of course, require
 the sudden stopping or starting of
 music at irregular intervals, an effect
 easily achieved if one grown-up
 stands by the set, and takes out or
 puts in one of the H.T. battery
 wander plugs according as the music
 is required off and on.

The other main type of musical
 game played by children is that
 in which the players are helped to
 find some hidden object by music
 sounding softly or loudly according
 to their nearness to success. The
 volume of sound can be varied in
 most sets by turning one of the
 condenser dials or by turning the
 filament resistances up or down.

As for the older children, even the
 most awkward boy with a terror of
 dancing finds it pleasant to steer a
 girl round the room to the magic
 and light-hearted strains of the
 Savoy Bands.

Let this be a kiddies' real wire-
 less Christmas!

A Story for the Boys & Girls

The Princess Dulcioria

A Wireless Fairy-tale with, incidentally, a Description of How to Make a Castle Crystal Set.

By S.N. Sedgwick.

Designs by Molly Dowler.

WHY she was called Dulcioria—if that is the way to spell her name—nobody knows. Perhaps because she had pretty airs, or pretty

plenty to occupy my time. Go away, and don't come here till you have solved my riddle. Never will I give my hand to anyone until a lover

comes who can set my heart thrilling and my pulse vibrating ethereally" (she did not know what that meant, but she got the word from a book of poetry), "and who shall bring to my ears songs of far away, and fill my hall with waves of distant music."

Such was the task she set her would-be suitors; and as you may guess, they found it an impossible one. Some sent

her presents of canaries and linnets, others brought raucous jazz bands and played outside the castle all day and all night, but they got worn out before the Princess did.

One who possessed an enormously powerful voice climbed the neighbouring hill and sang her serenades at the top of it ("it" referring to both his voice and the hill). Others sent her gramophones by special messenger, and musical boxes from Switzerland by registered post, to make sure she got them, but the more they pestered her the more adamant she was. She lined her great door with stout metal to prevent them from breaking in, and she laughed at their efforts.

It was not often that she allowed the castle door to be opened at all; but here (Fig. 2) is a photograph of it, in which you can see plainly the great metal shield at the back glittering in the sunlight, no less than 1-16th in. thick, and made of aluminium (or it may be of bronze).

You will see also that inside the castle entrance there is an enormous basket-work concern, looking not unlike a spider's web. That shows you how she occupied her time.

There was once another lady. Penelope by name, who kept her suitors off by spinning a shroud which she said she must finish before she could think of marrying, and every night she undid the work she had done during the day.

But the Princess Dulcioria wove baskets out of her lovely copper-coloured hair. Once a year she would sit there in the castle gateway, weaving them that all men might see and break their hearts at her implacable beauty, whilst she laughed to think their hearts were all entangled in her web. (Fig. 3.)

But we have not yet described all that could be seen outside the castle.

To begin with, you will notice the two massive fastenings that hold

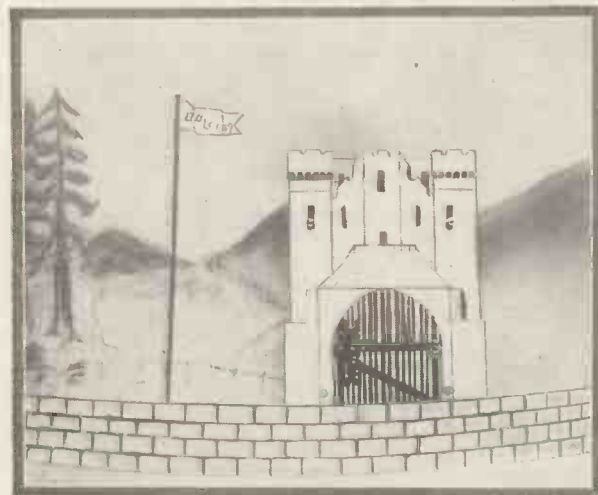


Fig. 1.—Princess Dulcioria's Castle.

ears, or a pretty voice, for her name may mean one or all these things.

But if so, it was not till the end of the story that she deserved the name; at the beginning of it she was lovely, it is true, but only in looks; for her airs were haughty and imperious, she was deaf to all beautiful sounds, and if ever she spoke it was either to scold or to be cross.

She lived, as you see, in a castle of her own (Fig. 1), and many were the lovers who came from near and far to sue for her hand. But she sneered at them all. "It is my money, or my lands, or my good looks that you seek," she said, "and I am not to be deceived by your protestations."

But as nothing she said stopped them from coming, and the more she disdained them the more they worshipped her, she thought she would keep them at a distance by setting them a competition.

"I have no wish to marry anyone," she said; "I hate you all. I am perfectly happy as I am; and I have

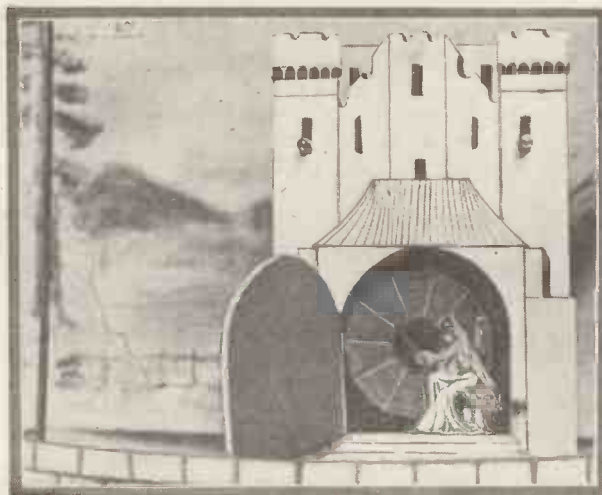


Fig. 2.—The copper on the back of the door.

the chain across the steps, lest anyone should be daring enough to attempt to enter when the door was open. They are *phone terminals* really; but she did not know that: she put them there because it was easy to pass the heavy chain through the hole in each of them.

Then you will notice also two guns that stick out threateningly from the casements in the towers. She had never dared to fire them off, being afraid of a noise; so she never knew that they could not be fired at all, because they were only *pillar terminals*. She liked the look of them, because they seemed to issue a warning to all strangers—"Beware."

Out in the courtyard there was a tall pole, from which her flag flew defiantly year in and year out. You can see it in Fig. 1.

And here (Fig. 4) you will notice a gallant knight on horseback. You would think that her pride and coldness would soon have ridded her of any suitor; but the fact was that the more difficult she became, the wider her fame spread, and when the local knights and squires had retired discomfited, others came from distant lands to try their wits against hers.

And amongst them—one day—came a gallant English knight. He

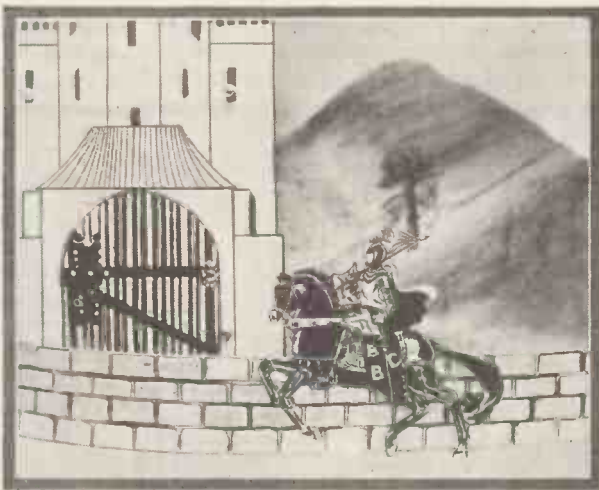


Fig. 4.—The B.B.C. Knight.

did not attempt to call upon her at all, but contented himself with pitching his tent outside her courtyard, with a pennon beside it and his shield below, on which were emblazoned three letters—B.B.C. (Fig. 5). He was a clever man, you see, and knew something about ladies.

At first the Princess laughed. "He'll soon grow weary of stopping there," she said; but as the days passed and the tent still remained,

she began to get a little interested. Those strange letters puzzled her and roused her curiosity.

"I know what P.P.C. means," she said to her ladies, "for many a knight has ended his efforts to see me with a card on which those letters were writ; but 'B.B.C.'—can they be his name, think you?"

But no one could tell her; and the longer the knight camped outside the wall the more intrigued was she. She lost her temper badly when even the seneschal and her own private reverend chaplain failed to discover the meaning of the letters in any of their learned books.

At last she did what she had never done before. She sent an envoy to him to inquire who he was. The messenger returned saying that the knight had refused his name, but stated that he was happy in being added to the number of those who were competing for her hand.

"He knows your terms, your Highness," said the messenger, "for he recited them to me—

'My heart must thrill
and my pulse vibrate
With waves of ethereal touch.
And I must hear
music of far away
Within my hall—not
much.'

The Princess stamped her foot. "To make a song about it," she said.

"I was never so insulted." But she longed all the more to know what B.B.C. meant.

More days passed, and the Princess had her door flung open one morning that the strange knight might see her weaving.

It was a big basket she was making, with 75 turns or so in it. But the B.B.C. knight paid no attention, nor showed in any way that he had even seen her door ajar.



Fig. 3.—The basket or "spider" coil.

"Gadzooks!" the Princess Dulcioria cried, exasperated, when she went to bed that night. "But I will not be outpatience by this scurrilous knight. Put me a new former up tomorrow and I will weave the biggest basket I have yet made, and we will see which of us gets tired first."

As a matter of fact, she wove that second basket of nearly 300 turns before the end of the story, and as both these numbers need to be remembered by those who would make a castle like hers, according as they live within ten miles of a broadcasting station or only within range of Daventry, they are important.

Meanwhile the B.B.C. knight went out, every day on horseback, armed to the teeth with a hammer and chisel. He climbed the surrounding hills, and more than once in the stillness of the hour of siesta the Princess heard the distant clink, clink, clink of his hammering.

When he came home to the tent at night he appeared to bring nothing with him to show what he had been doing; and this also aroused the Princess's curiosity. She sent some of her household retainers out to spy upon him, and when they found that he was chipping portions of rock from the hills here and there, rock that seemed to them to be of no value at all, her contempt showed itself in another manner.

"'Tis a symbolism that he is suffering from," she said; "as he chips the hills he thinks little by little to break my iron resolution. We will show him."

The next day there hung over the castle door a piece of similar rock that glistened in the morning light, and by its side a pointer, like a

silver catwhisker, that touched the centre of the rock (Fig. 6).

"Will he guess what it means?" she said, "or shall I put a legend by it? No, I will write him a cartel."

This was its wording:

"Your effort is vain. You can no more soften me by your persistence than find a sensitive spot upon the rock that hangs above my door."



Fig. 5.—The B.B.C. Knight's Tent.

But the knight, when he read the missive and glanced at the gleaming rock on the castle porch, said nothing but "Done it at last"; and the page, returning, reported to his mistress that the knight had simply kissed her letter, and laughed and danced a strange excited jig.

Which left the Princess Dulcoria more puzzled and more vexed than ever. Of course, she didn't understand, but you will; for without knowing it she had put up a crystal complete just where it was wanted.

The very next night the wonderful thing happened. At 6 o'clock, that magic hour which so many thousands of children know, the Princess thought she was taken ill.

Sitting in her hall, a sudden thrill ran down her spine. "Somebody's walking over my grave," she said, and sprang up, only to find that the strange eerie feeling did not pass away. There was a singing in her ears, and unaccountable noises in the room, whistling and crackling and uncanny howls.

The Princess screamed, and so did her ladies-in-waiting. The rest of her retinue came running in to the chamber, to find her lying senseless, and half her ladies, too. Meanwhile the noises continued, though there was nothing to be seen but the usual furniture, and the great basket coil,

like a screen, standing before the doorway. But all were in a state of tremendous vibration, and the basket screen was trembling so fast that you could not even see it move.

Even the chaplain shook with fear, though he pulled himself together enough to say "Retro, Sathanas" two or three times and to send off for a doctor.

Off went a faithful page on horse-back—not through the door you see in the picture (of course not, it has steps, you notice), but by the stable entrance—and in a shorter time than anyone had known before, he was back, saying he had met the B.B.C. knight, who having stopped him and learnt his tale bade him tell his mistress that he was qualified to put an end to the muddled

magic from which the house was suffering.

"He will come to your door," said the page, "but will not enter unless you open willingly to him."

Sure enough, the sound of a horse's hoofs could be heard outside, and a knock came on the metal-sheathed door.

The seneschal looked at the Princess. "Am I to open, your Highness?" he asked; and the Princess, who was swaying her head from side to side like one distracted or dreadfully ill, nodded weakly.

As the seneschal drew back the bolt and turned the key, a loud voice came from outside.

"Stay," it said, "open the door very slowly, and take heed. As it opens the distracting sounds will die away and distant music will take its place."

The seneschal obeyed the unseen speaker. Slowly the great door swung on its hinges, the horrid noises died down; far off a voice was heard:

"Hallo, everybody . . . zLO calling the British Isles. . . will sing 'Thy Sentinel am I' . . ."

The Princess saw nothing, heard nothing, but the distant music, so clear that it might have been in her chamber; but when it stopped she looked round like one waking from a dream. Her eyes fell on the knight, kneeling at her feet.

"I have entered, Princess," he said, "and brought music with me. Tell me, am I welcome?" . . .

And they lived happily ever after.

Of course, you want to know how the knight worked the trick. He won over the page who had been sent with the Princess's letter, you see, and whilst the Princess and her household slept the page spread a magic thread, which the knight gave him, over the house. It went from the pole, to which the knight fixed the beginning of it, to the terminal in the window, then to the beginning of the basket coil and the catwhisker. Then from the crystal to the first phone terminal; then afresh from the other end of the basket coil, to the other phone terminal, and the second terminal in the other tower window, and from there to the earth.

And if you build your castle in the same way, you will find that if you move the copper door away from the coil you will be able to tune-in whatever station you live

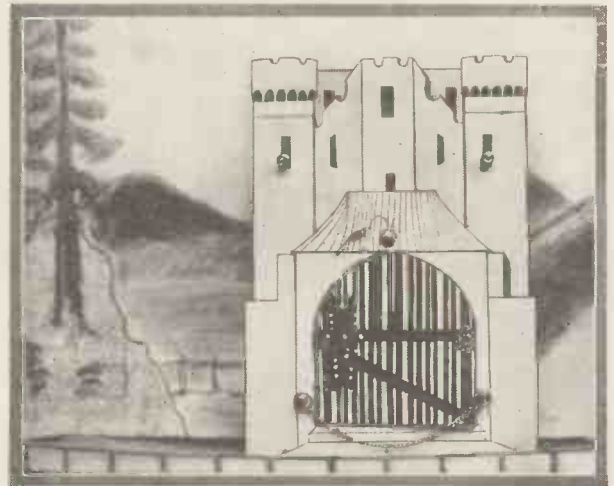


Fig. 6.—The Castle Set complete.

close to (using the 75-turn coil), whilst if you substitute the other coil, you will tune-in Daventry.

The only difference will be that as the Princess lived inside the castle she needed no phones; but you must fasten yours to the terminals by the steps.

Getting the Best from Your Loud-speaker

It is curious that the loud-speaker, an instrument which should actually make wireless more popular, has prejudiced so many people against broadcasting because they think the reproduction is "tinny."

Acoustically Perfect

But the majority of loud-speakers built to-day will give signals as pure as those from the phones. Careful research has produced an instrument acoustically perfect, or at any rate nearly so. In short the modern loud-speaker is a success.

Now let us examine the set itself.

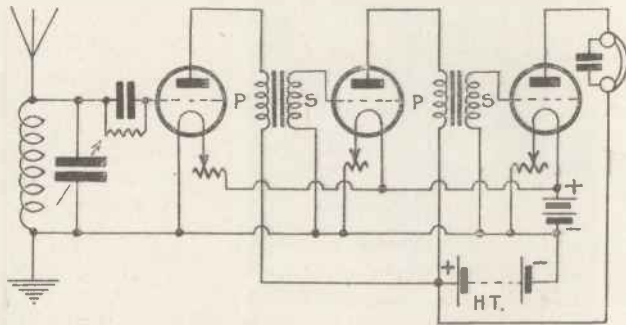


Fig. 1.—Transformer-coupled Low-frequency Amplifier.

High-frequency amplification is of little use where volume is concerned; hence note magnifiers have to be added to bring up the signals to the requisite strength.

By far the most popular method of L.F. amplification in this country is transformer coupling (see Fig. 1).

Unfortunately L.F. transformers introduce serious distortion; the amplification is not even over all frequencies and some notes are magnified more than others. Hence the unwanted "tinniness."

Negative Grid Bias

This may be reduced to a certain extent by placing a couple of dry cells between the filament and the transformer secondary in order to put a negative bias on the grid of the amplifying valve. This helps to keep the valve working on the straight portion of its characteristic curve.

But with iron-cored transformers some distortion is inevitable, and we should be wise to consider a different type of amplifier.

Unfortunately no other note magnifier will yield an equal measure of volume. The other methods of L.F. amplification—the choke and transformer coupling—deliver about two-thirds of the amplification per valve obtainable by the help of transformers.

The choke is not particularly satisfactory since it introduces nearly as much distortion as the transformer.

Resistance-capacity coupling, which alone produces smooth amplification, has also its drawbacks. The most important of these is the poor step-up, which is nothing like the amplification possible with transformers. The second is the high plate voltage needed.

Hence we must make our choice from these three methods of L.F. amplification; all of them are imperfect in some way or other. On the whole, however, the last on the list is to be preferred owing to the remarkable purity of the signals.

The next question is that of the detector—valve or crystal? The crystal is not satisfactory with H.F. amplification, and is troublesome to adjust. The valve is liable to produce distortion owing to faulty rectification. Here again we have to make the best of a bad job, and put up with the disad-



Mind your tuning!

vantages of the crystal, which, after all, is at least a perfect rectifier.

Taking all things into consideration we should be wise to choose a set consisting of a crystal and three L.F. valves coupled by the resistance-capacity method (see Fig. 2).

However perfect the system of amplification it is always better to put a smoothing condenser across the terminals of the loud-speaker.

Mellowness

This has the effect of making the speech and music delightfully mellow without a trace of tinniness. The value of the condenser in the case of a low-resistance loud-speaker should be about .01 microfarad, but in the case of a high-resistance type (2,000-4,000 ohms) a lower capacity must be used—.002 microfarad.

The great thing to remember is that the loud-speaker is capable of

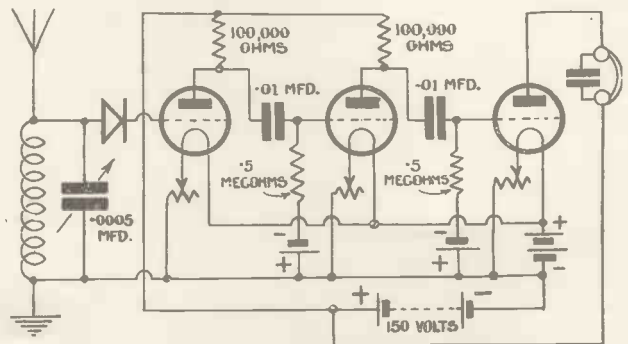


Fig. 2.—Resistance-coupled Low-frequency Amplifier.

delivering only a limited amount of volume; if this limit is exceeded the instrument will be overloaded and distortion will result. G. J. M.

Reggie Takes Up Radio!

FOR the reason that we seldom saw each other, Reginald and I were the best of pals. We don't speak to each other now because neither of us knows Esperanto.

It is said that "opposites" make firm friends. We were—and we did. Six months ago, nothing pleased me more than twiddling a telephone terminal. Reggie, on the other hand, from early morn till supper-time, browsed at second-

hand bookshops. Half-holidays, by way of variety, he dozed in the British Museum library. His forehead was puckered; his hair, minus; and his eyes, behind goggles, became more watery every day. The stoop of his shoulders was like the top part of the characteristic curve of a three-electrode valve. In a word, Reginald was a book-worm.

One day a parcel of books failed to arrive, so Reginald called on me.

"What's that?" he said, putting a moist finger on my favourite bit of hertzite.

"Don't! Don't!" I cried. "That's a crystal."

"Um—um. And what's a crystal for?"

"It rectifies—and that little chap amplifies."

"And the whole thing satisfies!" he sneered.

"It does. It satisfies me, at any rate."

"Um—um. Our gardener's got a barrowful of old iron and firewood you can have if you like."

I was a little hurt, but if I ever attempted repartee he hurled Shakespeare and what not at me till my battered framework was glad to crawl out of hearing.

"Put these on." I indicated a pair of phones.

He put them on. He took my easy chair and the whole of the fire

to himself. He suggested drinks and smoked all my cigarettes. I was glad when the stations closed down.

When they did, I had to go through the whole of the theory and practice of W.T. with multitudinous interjections from Reggie and numerous references to text-books. And the way he worked that poor old crystal-arm must have made it ache. He suggested I should use

"Come round," he said. "Come round to my den."

I went. He was merely in the crystal stage then, but he did not do things by halves. The crystal-in-chief was the size of an unbroken piece of coke. He was very proud to tell me his solenoid had 9,756 turns and when he had wiped up the B.B.C. he was after Mars. The cat-whisker!—well, the cat needed no hairdresser.

Later, he asked me to stay a week-end. By then he had arrived at the valve stage. Would that I had not gone! He had just got a transmitting licence, and positive ions could not hold him. There were photographs of Messrs. Armstrong and Flewelling and a WIRELESS MAGAZINE Structograph plate on the mantel.

He wore the phones in his morning bath. At breakfast he tuned to 600 metres, and a nibble of bacon would be halted with a jerk 'twixt plate and mouth.

And his language!

His pyjama strings were his aerials. His slippers encased his terminals. He put his spectacles on his sensitive spot; gazed through them with his dull-emitters. His tie was his A.T.I.; cuff-links were couplings; the maid was a utility switch; a glass of beer a transformer (low-frequency). This he always considered his best "choke."

The District Railway, too (on which he travelled to his charing job), was all a matter of circuits. The booking-office was, of course, the grid; his season ticket, a variable gridleak; a single ticket a 1-way switch; and a return a 2-way ditto. The platform was the cathode; the train an electron; the London terminus the anode; and the barrier the blocking condenser.

Alas! Poor Reggie!

C. T.

FATHER GIVES A HAND—



—with the Christmas Pudding when he can listen-in as well!

my valves to teach him iddy-umpty. He spun my condensers till they got dizzy. He played a sort of cribbage score with the H.T. battery, and got really annoyed when I tried to huff him. Whenever I turned my back, he shorted my accumulator to see that fascinating little spark. It was not until he heard the milk-can deposited on the doorstep that he thought he ought to go home.

I struggled to bed and slept for what seemed a month. Then Reggie came round and woke me up.

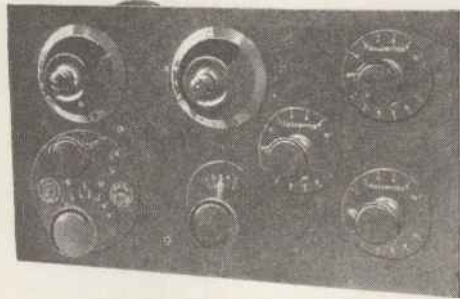
Poor Reggie! Better far had he stuck to his books! He had lost his job because someone found an article by "Halyard" in the till instead of coin.

He now had a job as charlady to a disreputable firm of wireless foisters in a far suburb.

A Brother to "As Good A Set As Money Can Buy"

The Best Possible Three-valver

For all ordinary purposes it has been found that a good three-valve set is sufficiently powerful to work a loud-speaker satisfactorily—hence this best possible three-valver, which has been specially designed, built and tested by THE WIRELESS MAGAZINE Technical Staff in our workshop.



The Completed Three-valver.

In as far as it incorporates some of the best-quality components on the market this set is a brother of the "As Good a Set as Money can Buy" straight-circuit four-valver that was described in Nos. 1 and 8, and which has proven so popular and successful amongst our readers.

SO great has been the enthusiasm created by the four-valver, "As Good a Set as Money can Buy," described in No. 1 and again in No. 8 of THE WIRELESS MAGAZINE, that we have constructed a brother set, this time using only three valves.

Only Three Valves Needed

Amongst the many reports received concerning the original four-valver several indicated that, unless exceptional volume is required, the fourth valve is unnecessary.

This bears out our own experiments, for with the actual set described nearly all the European, together with one or two American, stations have been received with three of the four valves, whilst it is only on exceptional occasions that the extra valve is switched into circuit.

It will be seen that the circuit of the three-valver is quite straightforward—a circuit that more than holds its own in spite of the numerous "supers" and "reflexes" that appear from time to time.

The tuning arrangement consists of a solenoid coil tapped at frequent intervals by a rotary switch arm with which is incorporated a dead-end eliminating device.

The tapped coil is tuned by a

.0005-microfarad condenser and has eight studs marked on the dial with the first eight letters of the alphabet. With the size of variable condenser indicated the tuning range lies between 175 and approximately 2,000 metres.

The special dead-end switch is a great factor in the efficiency of the unit, for the reason that losses in a tapped inductance are mainly due to the lines of force induced in the sections in use also threading the idle sections and inducing a difference of potential across these tapplings. Owing to leakages, which are impossible to eliminate entirely, this potential results in energy loss.

section opposite in nature to the useful section. This opposing field of force screens the original lines of force from the remaining unused sections.

Reaction is obtained by a small coil mounted at the end of the unit operated from the front of the panel by bevelled gearing.

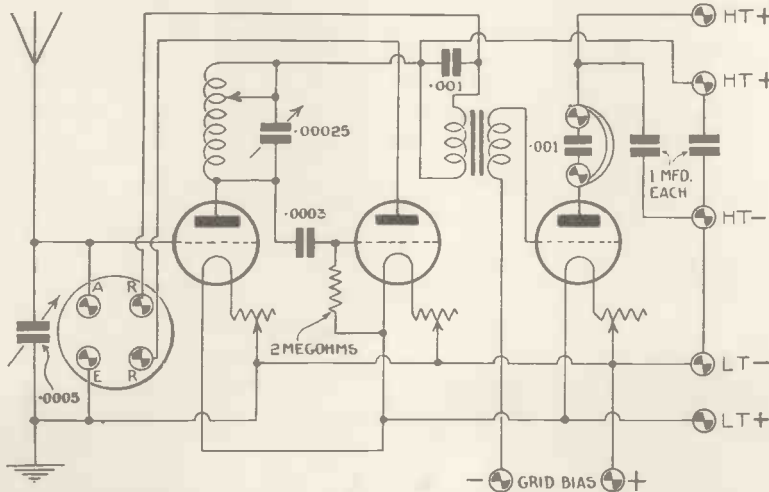
Tuning Range of Anode Coil

From the circuit diagram it will be seen that the first valve is a high-frequency amplifier working on the tuned-anode principle. Again the anode coil has incorporated with it a similar dead-end switch. Five tapplings are provided, the first giving a tuning range from 200 to 450 metres; the second from 325 to 700 metres; the third, 500 to 1,000 metres; the fourth, 850 to 2,000 metres; and the fifth, 1,650 to 4,000 metres. The tapped coil is tuned by a .00025-microfarad variable condenser.

After the high-frequency valve follow the detector and low-frequency amplifying valves, provision being made for the appli-

cation of a higher plate voltage and grid bias to the low-frequency amplifier.

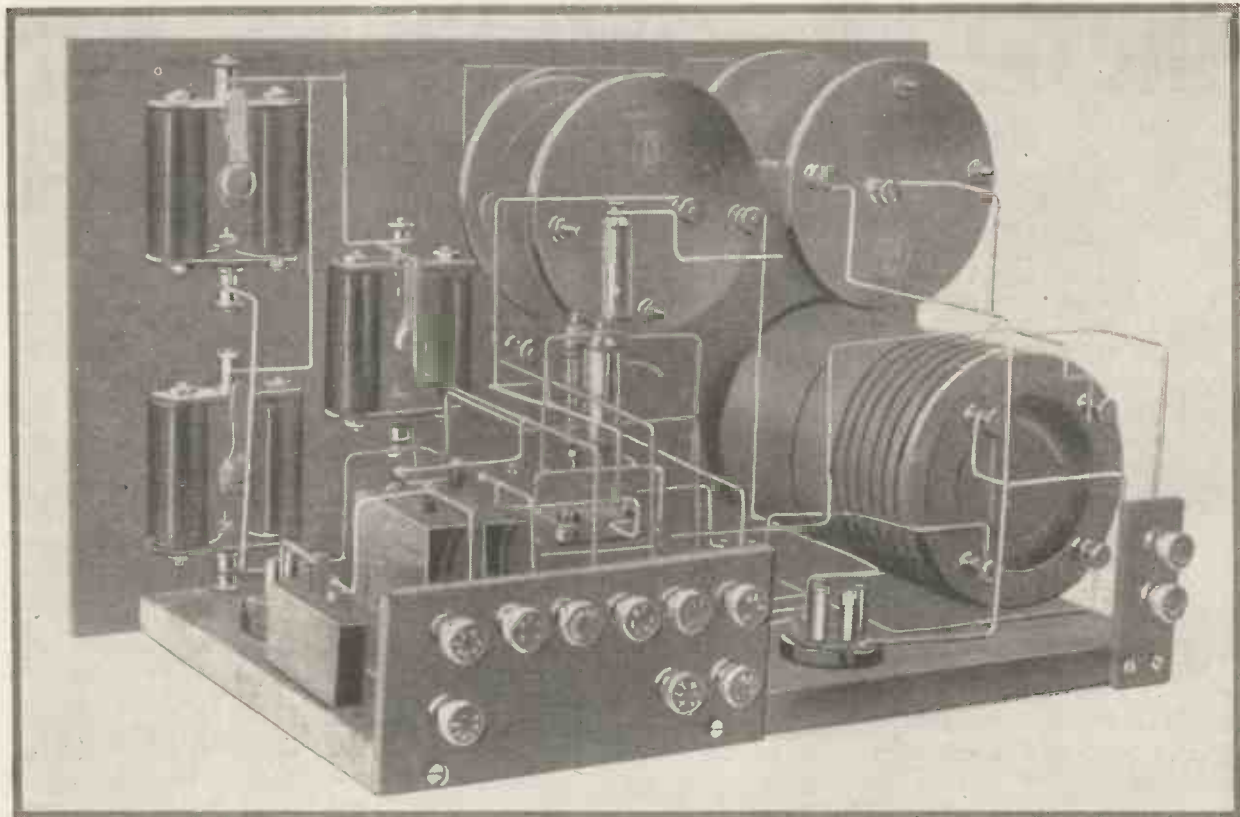
Components required for the construction of this receiver are as follow:



Circuit Diagram of the Best Possible Straight-circuit Three-valver.

Hence, in this tuner unit the section immediately adjacent to the section in use is short-circuited, thus eliminating the difference of potential and at the same time introducing a field of force in the short-circuited

The Best Possible Three-valver (continued)



This photograph shows clearly the Wiring of the Best Possible Three-valver.

Ebonite panel, 14 in. by 8 in. by $\frac{1}{4}$ in. thick (British Ebonite Co., Ltd.).

Retroactive tuner (Radio Instruments).

High-frequency intervalve unit (Radio Instruments).

.0005-microfarad square-law variable condenser with fine-adjustment or vernier plate incorporated (Radio Instruments).

.0025-microfarad square-law variable condenser with fine adjustment (Radio Instruments).

Low-frequency transformer (Marconiphone Junior).

3 filament rheostats (Radio Instruments Duostats).

3 baseboard mounting valve holders (Peto-Scott).

11 terminals (Belling Lee).

2 1-microfarad fixed condensers (T.C.C.).

.001-microfarad fixed condenser (T.C.C.).

.001-microfarad fixed condenser (Wates).

.0003-microfarad fixed condenser (Wates).

2-megohm grid leak (Darco).

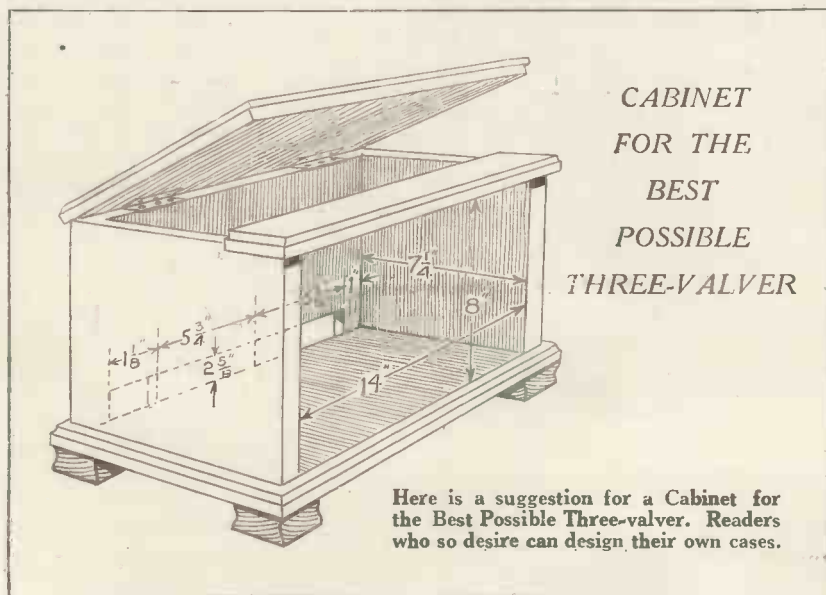
Ebonite terminal strips, 5 in. by $2\frac{1}{2}$ in. by $\frac{1}{4}$ in. thick and 1 in. by $2\frac{1}{2}$ in. by $\frac{1}{4}$ in.

Wooden baseboard 12 in. by 7 in. by $\frac{1}{2}$ in. thick.

Cabinet as shown in dimensioned sketch.

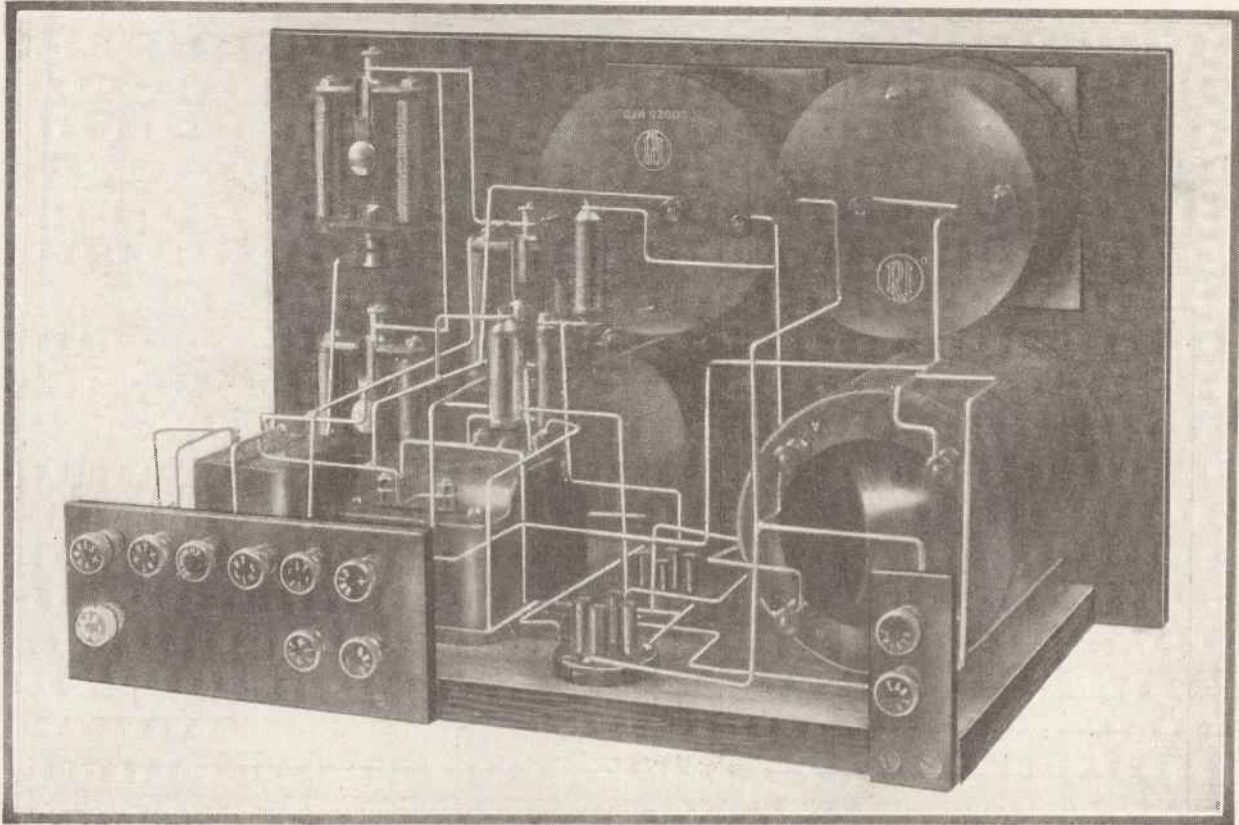
The panel may be obtained from the British Ebonite Co., Ltd., of Hanwell, London, W.7, with one side polished to a high degree, but with the back matted.

With the exception of the tuner all the components are one-hole



Here is a suggestion for a Cabinet for the Best Possible Three-valver. Readers who so desire can design their own cases.

A Brother to "As Good A Set As Money Can Buy"



Another View of the Wiring of the Best Possible Three-valver.

fixed. Six holes are required for the tuner, but the engraved dial can be used as a template. As the tapping studs of both the tuner and high-frequency units are mounted on the components together with the rotary switch arms a great deal of trouble is avoided in drilling.

Filament Rheostats

On the right-hand side of the panel, looking from the front, the three filament rheostats are mounted. The two dials seen at the top of the panel control the variable condensers, whilst directly underneath them on the left and right the tuner and high-frequency units respectively are mounted.

On the baseboard, which consists of a piece of hard wood such as teak, the remainder of the components are screwed down in the positions shown in the wiring diagram. Plenty of room should be allowed for the tuner at that end of the baseboard.

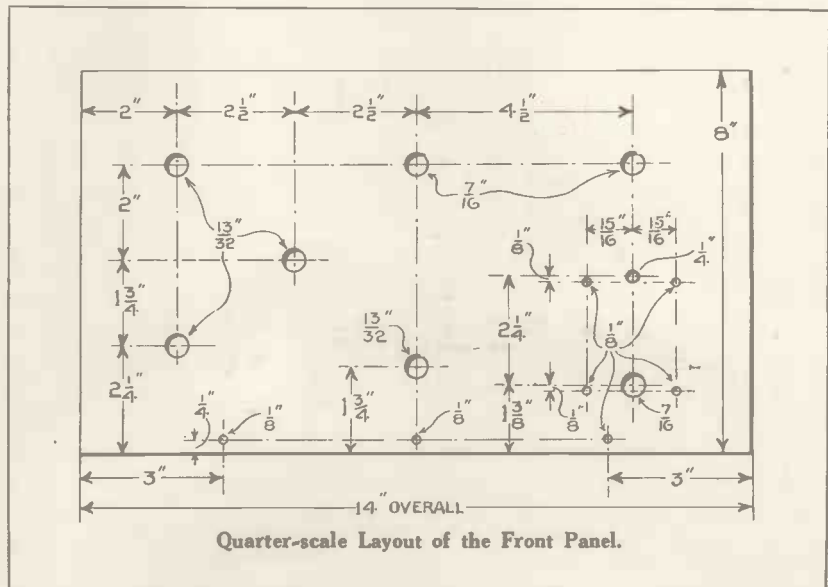
The two terminal strips are mounted on the back edge of the baseboard at each corner. The small

strip behind the tuner carries the aerial and earth terminals, whilst on the other the H.T., L.T., phone and grid-bias terminals are mounted.

Two fixed condensers, each of

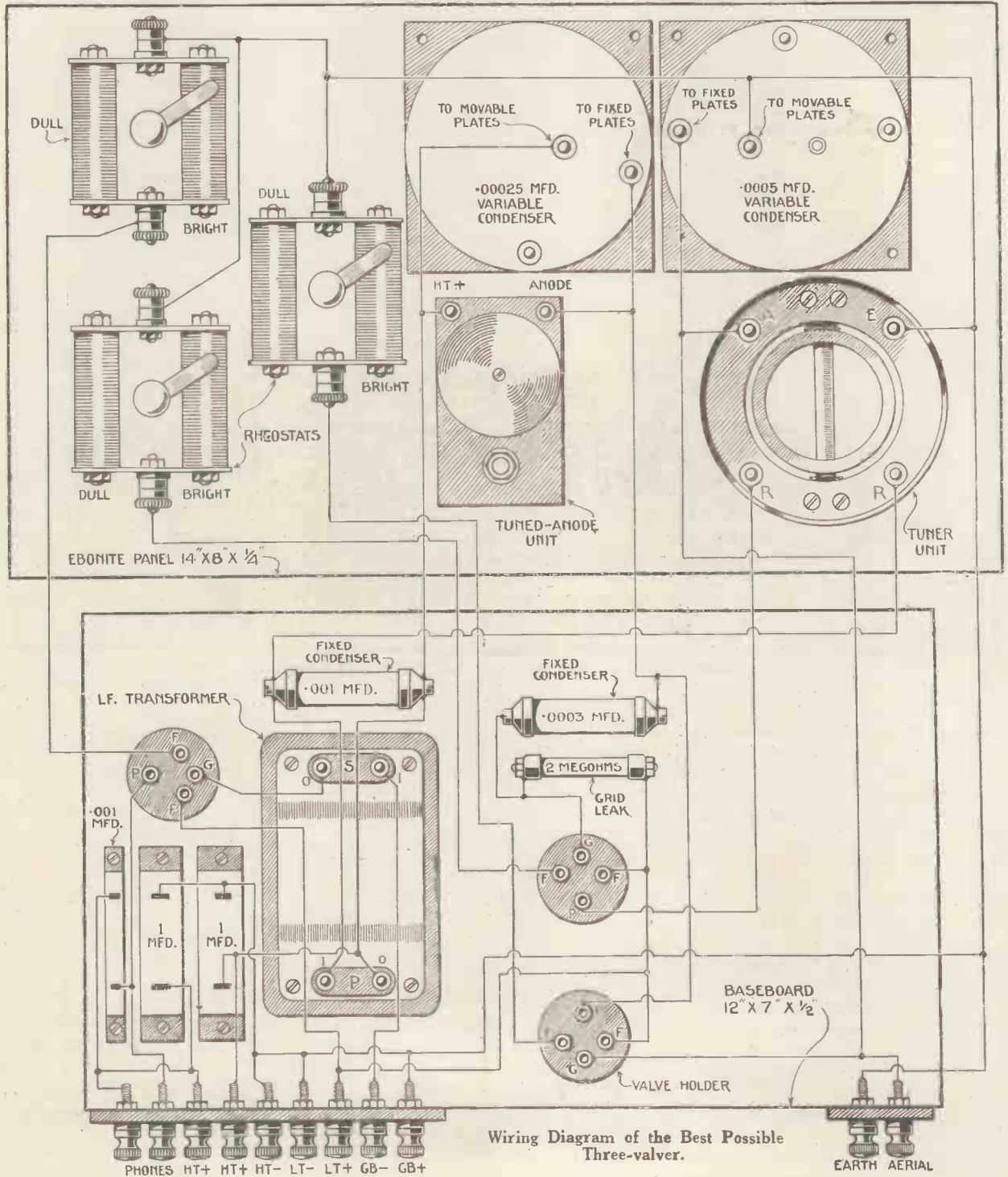
1-microfarad capacity, are placed just behind the larger terminal strip and are connected across each of the H.T. + terminals and H.T. -.

Because of their small dimensions



Quarter-scale Layout of the Front Panel.

The Best Possible Three-valver (continued)



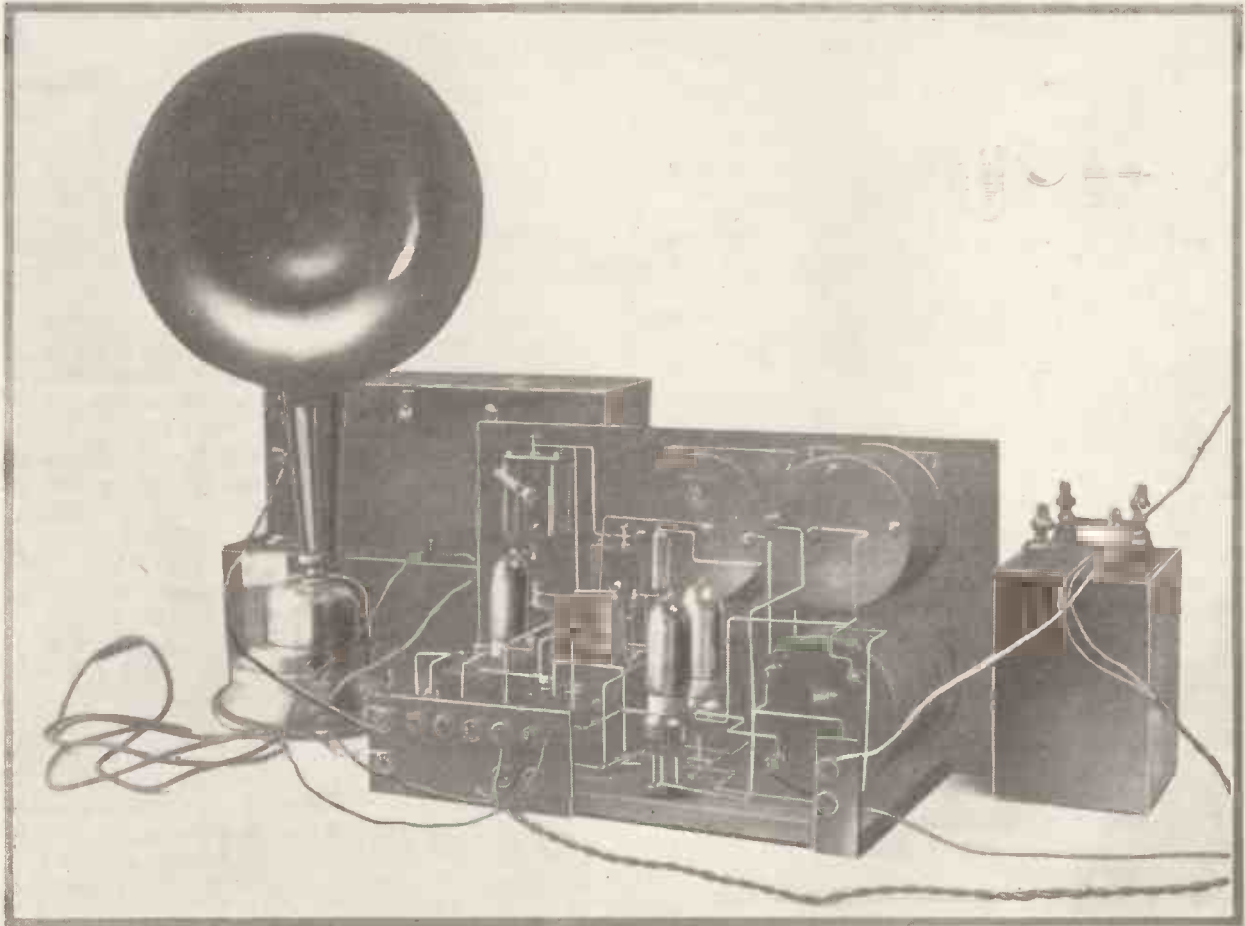
and weight the two Wates fixed condensers and the grid leak are not screwed down to the panel, but are held in position by the connecting wires, which should be of No. 16 gauge.

Wiring, if carried out in conjunction with the diagram, is a comparatively simple matter. Care should be taken to leave sufficient room round and above the valve holders for the insertion of the valves. To

ensure that this is so it is better to wire up as many of the components as possible with the valves in the holders.

A suitable cabinet in which to house the set is shown in the dimen-

Specially Designed by "The Wireless Magazine"



The Best Possible Three-valve Connected Up for a Preliminary Test.

sioned sketch. The construction of the cabinet should be placed in the hands of a competent carpenter. Although a polished mahogany cabinet looks very nice when it is new, in a very short time scratches caused by the constant wiping off of dust will soon spoil its appearance. For this reason it is better to employ fumed oak, which has a very good and lasting appearance. The wood is a matter of personal taste, however.

Suitable Valves

Perhaps the most important point is the choice of suitable valves. If good volume is required, a power valve should be inserted in the low-frequency valve socket. Good results will never be obtained by endeavouring to obtain volume from a general-purpose valve.

We have used three Cleartron valves—two of type CT25 and one of type CT25B, these requiring a 6-volt accumulator.

As a good alternative two Marconi DER's may be used for the high-frequency and detector stages, followed by a DE6. All these valves need a 2-volt accumulator.

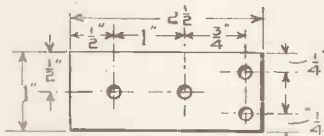
With the Cleartron valves about 60 volts on the plates of the high-frequency and detector valves was

found to be satisfactory, whilst the CT25B can take 200 volts on the plate with 3 volts negative grid bias. Approximately similar voltages can be used with the Marconi valves, with the exception of the DE6, which required less plate voltage.

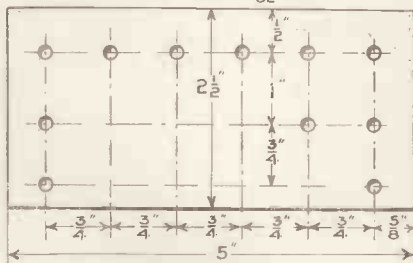
Excellent Results

Results obtained with this set were really excellent. It was tested on an indoor aerial about 8 miles west of 2 L O. This station came in at such tremendous volume that the loud-speaker could be heard all over the house. Daventry was received with almost equal volume.

Using phones, many other stations were logged, including Königswusterhausen, Radio-Paris, Hamburg, Brussels, L'Ecole Supérieure, and several of the English stations. Tuning is rather critical, and at this distance from London 2 L O was difficult to cut out on neighbouring wavelengths.



NOTE: ALL HOLES 5/32" DIA.



Details of Terminal Strips.



Wireless Femininities

Christmas is, above all others, the season of traditions, and why should not wireless add a new one which in course of time will become as valued as any?

or installing a loud-speaker to replace earphones, actually gives far more permanent enjoyment than a visit or two to the pantomime, don't you think?

And somehow the money for such extras is forthcoming more readily at Christmas than at any other time.

Building-in the Wireless Cabinet

This is the era of built-in furniture, which saves trouble and expense, besides making the most of the decorative possibilities of our rooms.

Now that listening-in has become a permanent feature of home life, the time seems ripe for the numerous folk who are erecting their own houses to plan a built-in wireless cabinet for the sitting-room, while those many who live in dwellings already equipped and capable only of slight modification will find that certain existing features lend themselves readily to adaptation by home labour.

The other day I saw an attractive scheme carried out in a lounge which, each side of the spacious fireplace, has bookshelves built-in above and cupboards below. On one side these fittings were left untouched; on the other the lowest bookshelf was removed, the doubled width thus gained giving ample space to house the wireless set. Incidentally it was at just the height and in just the position to be manipulated without rising from a fireside armchair.

The top half of the cupboard beneath was divided by a number of uprights into a filing cabinet for storing alphabetically all sorts of wireless information, such as newspaper cuttings, catalogues and so forth; while the bottom half was piled with neat stacks of THE WIRELESS MAGAZINE.

Of course, the idea can be endlessly adapted to suit differently planned rooms. A Christmas present given by a family to itself on these lines would be a joy from January to December.

Which reminds me—why not, this year, divert the money usually spent on such a family gift or on a Christmas outing shared by young and old alike to wireless purposes?

Exchanging a crystal for a valve set to get better and wider reception,

Would-be Linguist

I was hearing recently of a Frenchman living in the depths of Brittany, out of reach of all English people, who is learning our language by the self-taught method, and finds listening-in to talks given by British stations a great help in acquiring correct pronunciation and familiarity with English as she is spoken. Some of us find the French and other foreign broadcasts help us in a similar way.

Here's another suggestion as to how wireless can teach a foreign tongue. Get a Bible in the language you are learning, and at every church service, whether actual or by the microphone, follow the reading of the lesson in your foreign Bible. This form of translation at sight soon breeds a greater knowledge of the foreign tongue with a minimum of effort—and the foreign tongue at its best, since the Bible is renowned for its beauty of language.

I tried this plan years ago with Spanish, and can vouch for its ease and effectiveness.

"The Home Hop"

For home wireless dances within the dimensions of a room the number of couples must be few—just about as many, in fact, as is afforded by the average Christmas assembly of relatives with a few guests added. Holly and mistletoe, hung for the festive season, are the ideal decorations for the dance room; and for such an unpretentious affair refreshments are naturally of the simplest. So wireless dances this Christmas ought to be many and jolly.

Incidentally, more or less regular "hops" of this kind through the winter, in his own home, coax the growing boy into being a good dancer before he has realized he is being drawn into anything so "girlish."

A. M. M.

CHRISTMAS will soon be upon us, and Yule time is notoriously dancing time, even in these days when Terpsichore is honoured all the year round. It's at Christmas especially that one notices a significant, if minor, thing that wireless has done for our pleasures; it has restored the small private dance—that unpretentious, intimate, jolly home "hop."

A few years ago we heard our parents talk of the dances of their day, when a pianist was engaged, a drugget laid over the drawing-room carpet and couples sat out draughtily on the stairs—not at all to the detriment of flirtation! We sniffed contempt of such make-shifts and went off arrogantly to a glittering dance hall with a syncopated orchestra. Dance on a drugget to a piano, indeed!

But wireless has changed all that. Dancing at home among a few intimates always had a peculiar charm, and the loud-speaker set has added that primary essential—first-class band music; while modern furnishing habits offer the polished parquet floor with its excellent dancing surface.

Grand "Merry Christmas"

As a listener-in who found the Grand Good Night both impressive and touching when it was first broadcast some months ago, I am hoping (this page is written before the Yuletide programmes are known) that the B.B.C. will give us a "Merry Christmas" greeting on similar lines to be repeated annually on December 25 only.

Tincture of Mirth :: More Sorrows of a Salesman

CHOOSING the slackest time of the day for the purpose of making a slight change in his window display, the salesman was standing with his head and shoulders in the window rearranging the headphones, which were strung on a length of copper wire along the front.

Engrossed in his occupation, he did not notice that a customer had entered the shop; and only became aware of the fact when a loud whistle, followed by a refined voice murmuring: "Wonderful, positively wonderful!" penetrated his brain.

Hastily withdrawing his head from the window, the salesman discovered a well-dressed middle-aged man of benevolent aspect gazing round the shop as if fascinated. Clearing his throat, he gave the stranger a hearty good-morrow and expressed a great desire to know in what way he could be of service to him.

"I am bound to confess, sir," said the stranger, "that what I see in your wonderful shop fills me with something akin to awe! I venture to assert, sir, that had you lived in the days of good Queen Bess, you would have come to an untimely end!"

The salesman gaped. "I beg your pardon, sir," he said at last.

"I do not, perhaps, make myself clear," continued the stranger. "In Tudor times, sir, the mere possession of such a collection of weird and wonderful instruments would have attracted to your shop myrmidons of the law, and 'magician' would have been the least opprobrious epithet applied to you. To me, however, the most extraordinary thing about it is the fact that the instruments are no more a source of wonder to you than a kite to a small boy!"

Here was something the salesman could understand and appreciate. A well-dressed and evidently highly-educated man who knew nothing of wireless! Here, surely, was where a keen business man seized time by the forelock; struck the iron while it was hot, and, to use a vulgarism, got his teeth well into the dough!

He smiled deprecatingly. "You flatter me, sir! The little knowledge I possess—and I have been told

that I have a reputation as a wireless expert second to none in the trade—is ever at the service of customers. I take it, sir, that you are desirous of entering the ever-swelling ranks of listeners to the magnificent programmes broadcast by the various stations throughout the country?"

"You display a sound knowledge of human nature, sir," declared the stranger. "It is true that I have recently been intrigued by the infinite possibilities of wireless telephony, especially as regards its subservience to the common weal in the matter of the dissemination of valuable information. I would,

WE HEAR THAT—

Broadcasting on the Russian railways is getting quite common. We hope they don't broadcast anything that is likely to hurt men working on the line.

A Radio University has been suggested. We know lots of our neighbours who would qualify with honours for the degree of Bachelor of Oscillation.

A group of wireless fans have been complaining that the picking up of programmes has been made too easy from a technical point of view. Evidently they don't live in the 2 L O area.

Berliners are having physical jerks by wireless. Evidently they are going in for the new cult of girth control.

however, deprecate its use for the purpose of spreading knowledge appertaining to the acquisition and preservation of health."

Probably a wealthy physician, thought the salesman, and good for a fifty-guinea set at least. "No doubt you are perfectly correct, sir. Now, what would be your fancy as regards a wireless set? A glance round the shop will amply repay you for your trouble, sir. I have no hesitation in saying that for variety, utility and inexpensiveness, my stock is unsurpassed—outside, of course, the large wholesale houses. You will find everything, from the simplest

crystal set to the super-duplex-hetero-oscilladyne. The latter instrument, sir, is unsuitable for children of tender years. Ahem! Ahem! You will excuse me, sir, but my throat is a little husky. I have had a great many customers to-day, and I have possibly done a little too much talking."

The stranger's eyes gleamed. "Do you find it somewhat difficult to carry on a prolonged conversation without becoming husky, sir? Is it a common experience for you to lose your voice almost entirely after a harassing day spent in explaining to your customers the correct manipulation of the safety-valves and mortal coils, et cetera, which you offer for sale? You may have complete confidence in my discretion."

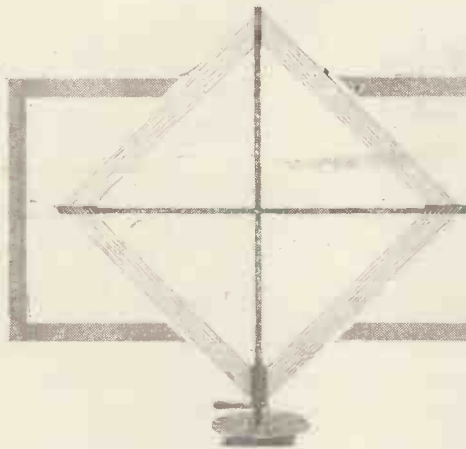
A specialist's advice for nothing was not to be despised, and the salesman admitted that he suffered as described. "Possibly you can recommend some simple remedy, sir?" he said. "There are times at the end of a hard day when I feel that life is scarcely worth living; and only the knowledge that I have benefited my fellow-creatures by supplying them with apparatus of the very highest class at the lowest possible prices for cash gives me the power to bear my physical discomforts with fortitude. It is at such times, sir, that my spirits are at their lowest ebb, and I am fit company for no man."

Walking over to a chair, whereon he had placed a large black leather bag, the stranger drew out a bottle. Holding it in one hand, and striking it at frequent intervals with the other, he closed his eyes and declaimed as follows: "I have here, my friend, a powerful yet demulcent palliative for all throat and other troubles! It is a panacea for all banes and evils! One dose make a hopeless pessimist leap for joy! What do I call it, you ask? Tincture of Mirth, I reply and . . . owch!"

The soldering bit, thrown by the infuriated salesman, caught the quacksalver a glancing blow on the left ear. Seizing his bag, he vanished through the doorway just as the salesman let fly with a 60-volt dry battery!

A. H.

"Meets A Long-felt Want."



A FRAME AERIAL WITH STATION INDICATOR

A unique device invented, built and tested by "The Wireless Magazine."

OWING to the increasing demand for selective reception the frame aerial is becoming more and more popular and, indeed, for certain types of receivers a frame aerial is a necessity. Its directive properties give the receiver with the flattest tuning a selectivity which no other method other than an alteration of the circuit would produce.

Strength of Signals

The strength of signals increases as the plane of the frame is made directional with the advancing waves

from a broadcasting station, this position being the best for reception from that particular station.

But the trouble that most amateurs find when trying to receive a distant and elusive station on a frame aerial is that they do not know in which direction the desired station lies. Hence they rotate the frame round and round in an endeavour to find it, in all probability passing and re-passing the correct position.

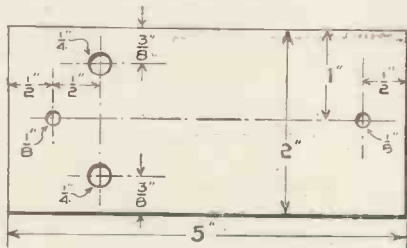
A very desirable feature that should be incorporated with every frame aerial is an indicator chart

like that shown in the diagrams and photographs. This indicator chart consists of a stout piece of paper (Bristol board is very suitable) cut in a circle, 12 in. in diameter.

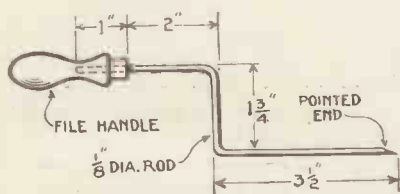
Marking the Indicator

With the aid of a large map the directions of the principal broadcasting stations in Europe and America should be marked on the indicator, each direction radiating from the centre of the circular card. The directions of the lines

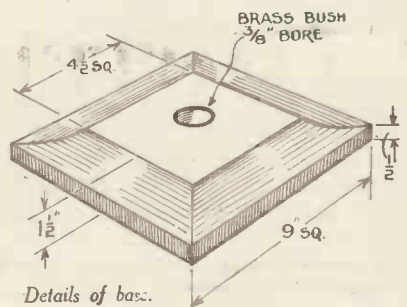
(Continued on page 508)



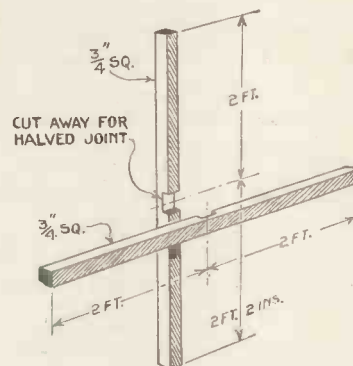
Terminal Block.



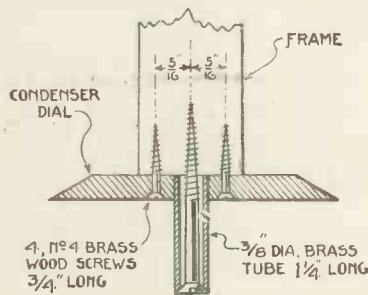
Handle and pointer.



Details of base.



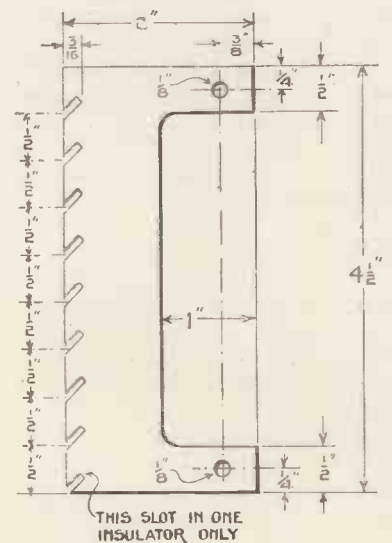
Details of cross-pieces.



Method of fixing dial to frame upright.

DETAILS OF FRAME-AERIAL CONSTRUCTION

(Below).—Ebonite insulator with slots to accommodate wire.



LISSENIUM

Making Condensers precisely—

TOLERANCES in engineering practice mean the limits above or below a specified size to which the dimensions of the finished product must be kept. The closer the limits allowed the greater is the need for skill on the part of the operator, the more expensive his labour, and the more costly is the finished article.

There is no reason why users should accept the old wide limits in the capacity of fixed condensers. Fixed condensers can, by proper manufacturing methods, be made close to the marked capacity. LISSEN FIXED CONDENSERS are made very close to their marked capacities—actually within 5 per cent. And at the same time we are doing this we are also making sure that no matter what the temperature conditions behind the panel may be, LISSEN FIXED CONDENSERS will not vary and will not leak.

FIT LISSEN AND MAKE SURE

LISSEN FIXED CONDENSERS.

.0001 to .0009	2/-
.001 to .003	2/6
.004 to .006	3/-



Leaks which make a silent circuit—

IF the resistance of a fixed grid leak alters after being some time in use you cannot correct it. A variable grid leak has a flexibility in this respect not possessed by the fixed leak

THE LISSEN FIXED GRID LEAK is unalterable because its resistance is sealed. The set builder uses both fixed and variable leaks. There is, therefore, also the LISSEN VARIABLE GRID LEAK which provides that extra facility in control which is worth a great deal when needed. A variable grid leak should not be expected to alter signals pronouncedly in all circuits. In certain critical circuits it is indispensable, however.



LISSEN FIXED GRID LEAK
(pat. pending)

1/8



LISSEN VARIABLE GRID LEAK
(pat. pending)

2/6

ASK YOUR DEALER

for leaflet on LISSEN CHOKE COUPLING for L.F. amplification. If any difficulty send postcard direct. TEXT BOOK OF LISSEN PARTS will also be sent if 3d. enclosed for postage.

LISSEN LIMITED

LISSENIUM WORKS,

500-520, FRIARS LANE, RICHMOND, SURREY.

Phone : Richmond 2285 (4 lines). Grams : LISSENIUM, PHONE, LONDON.

LISSEN PARTS—WELL THOUGHT OUT, THEN WELL MADE

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

A Frame Aerial with Station Indicator (Continued)

of course, depend on the locality of the receiving station. A chart so made in Scotland will differ from one made, say, in the south of England.

Perhaps the best method of plotting the directional lines on the chart is as follows: The receiving station, of course, is the centre of the chart on which the frame aerial pivots. From the centre a line is drawn to the circumference. This line is marked "North."

Taking a Bearing

The map is then consulted and by means of a protractor the angle formed by lines drawn from the magnetic North Pole and Paris, say, to the locality in which is situated the receiving station is measured. Another line is then marked off on the chart so that the angle formed by the "North" line and the new line is equal to the angle measured on the map. This new line is then marked "Paris."

This method of plotting should be done for each station. Thus all the angles between magnetic North and the broadcasting stations on the map are transferred to the chart.

Having completed the plotting of the indicator chart the frame aerial should be mounted so that its vertical pivot passes through the centre of the chart. By means of a small pocket-compass it can be ascertained in which direction the magnetic North lies from the receiver. The "North" line of the chart should point in this direction.

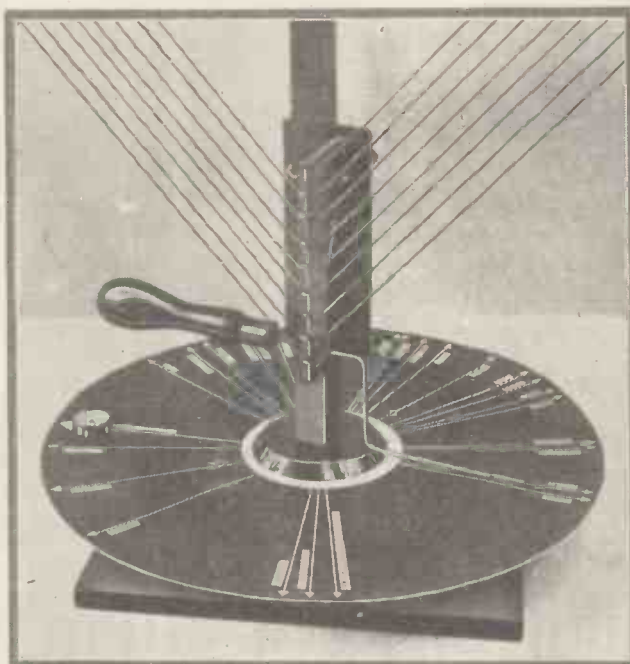
Tuning-in

Then, by turning the frame aerial so that its plane lies along one of the lines drawn on the chart, that particular station may be tuned-in, provided, of course, that the receiver is sensitive enough.

For the benefit of those who care to make up a frame aerial incorporating the indicator chart a few constructional details and photo-

graphs are given of a very efficient aerial of this type.

Two pieces of wood are required for the cross-pieces, 4 ft. and 4 ft. 2 in. respectively and of $\frac{3}{4}$ in. square cross section. Four slotted ebonite insulating strips as illustrated



Base of Frame Aerial complete with Indicator.

are required on which the turns of wire are wound. These insulating strips are sawn out of $\frac{1}{4}$ -in. ebonite and the slots are cut in a slanting position to prevent the wire from slipping out.

Bearing Surface

To one end of the longer wooden cross-piece is screwed a flat ebonite condenser dial to give a bearing surface on which the frame may rotate. A hole is drilled through the centre of the dial just large enough to pass a piece of $\frac{3}{8}$ -in. diameter brass tube $1\frac{1}{2}$ in. in length. The brass tube is clamped in position by a 2-in. brass wood screw.

The two wooden cross-pieces are fixed together by a halved joint, as shown in the sketch, whilst the ebonite insulating strips are screwed at equal distances from the halved joint. Care should be taken that the strips are screwed down so that the slots are slanting in the right

direction, otherwise it will be impossible to keep the turns of wire in position.

No. 24-gauge double-cotton-covered wire is used for winding. Starting at the outside slot of the bottom strip the wire should be wound round in spider-web fashion until each slot holds one turn of wire. The two ends of the wire are soldered to the sockets mounted on the insulating strip screwed to the bottom of the cross-piece.

Ease of Adjustment

For ease in adjustment a handle and pointer is fitted to the bottom of the vertical cross-piece in such a fashion that the pointer travels over and about $\frac{1}{8}$ in. from the indicator chart.

Why the High-Power Station Seems Weak

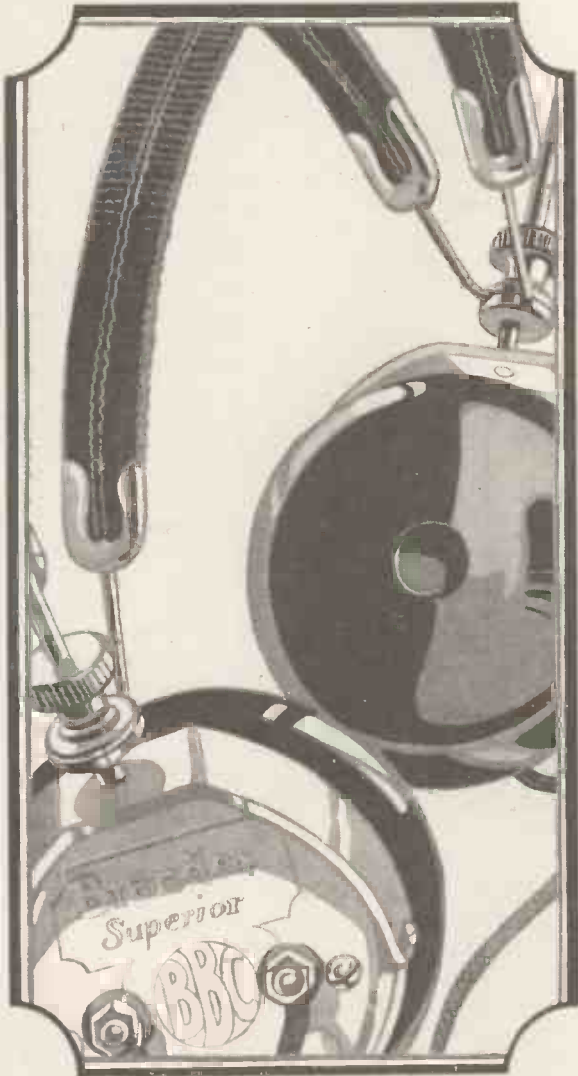
VERY often a set which will receive both the H.P. station and 2 LO, and which is located midway between the two stations will receive 2 LO at a strength double that of Daventry in spite of the greater power of the latter. This is because the limitations of our aerials do not permit of our picking up the same amount of energy per half cycle as we do with the small aerial which we use for 2 LO.

It is known that a maximum of signal strength is obtainable when the aerial comprises the major portion of the aerial-tuning inductance, and when tuning-in the longer wavelength we are simply loading up the aerial inductance with a large tuning inductance for tuning purposes. This tuning inductance serves no other function than that of tuning, and is really a dead loss so far as efficiency is concerned, but if we could extend the aerial to a considerable distance, the H.P. station would be the stronger station.

The average suburban garden does not permit of this extension, however.

Superior "Matched Tone" Headphones

TRADE MARK



THE receivers of *Matched Tone* Headphones have no interests apart. Their whole existence is wrapped up in one another. Gently led into these paths of concerted effort by our *Matched Tone* apparatus they each give of their best to exactly the same degree. That is the secret of *Matched Tone*—team work. Obviously, this achieves a desired end. It removes any possibility of one receiver being half a tone lower than the other and the distinct risk that tone, sensitivity or volume may not synchronise in both receivers. Brandes receivers definitely capture these three essentials in perfect unison. Does not this mean re-doubled excellence?

Ask your Dealer for *Matched Tone*

20/6

Brandes Limited, 296 Regent Street, LONDON, W.1
WORKS: Slough, Bucks

Brandes

Experts in radio acoustics since 1908



Table-Talker
30/6

Audio Transformer

Ratio 1 to 5-
17/6

The Brandola
90/6

Finding the Circuit to Suit ME!

I WAS fully determined to build a new wireless set. I was as equally determined that when I *did* build it, it would be the very last word in up-to-dateness and efficiency. I would use only the very best components obtainable, and would take the greatest possible care over the construction. The only thing that remained to be done was to choose a suitable circuit.

Yes! That was all, but it proved to be no easy job. I dug out the piles of back numbers of the only magazine that matters, knocked the dust off old *Amateur Wireless* numbers, picked out copies at random, and glanced through their pages. This did not help me much; rather did it confuse me further. It was not that I could not find a good circuit, it was simply that I could not "see the wood for the trees."

Consulting the Expert

Finally, almost in despair, I decided to consult The Expert.

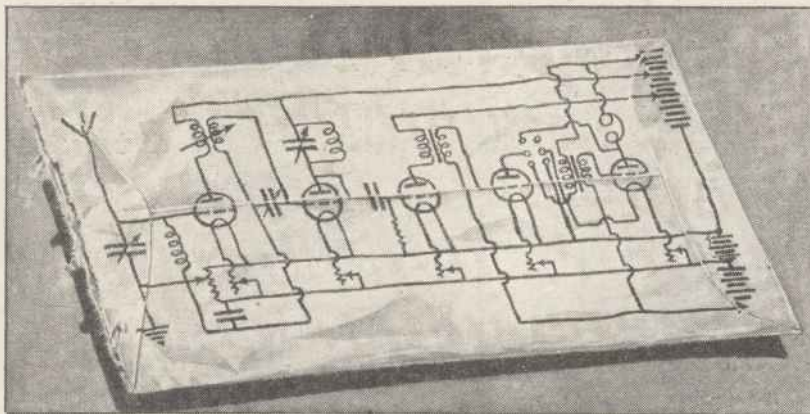
As I, with others, had assisted him in getting his monster mast from a horizontal to a vertical position (some job, let me tell you), I felt that I had some little claim on him.

* * * * *

I found The Expert busy with what I at first took to be a one-valve set. His conduct, however, puzzled me. He was not wearing headphones and did not appear to be tuning-in to anything. He would move the slider of a potentiometer carefully, a very little at a time, all the while looking anxiously at some meters which were mounted on the panel. Every now and then he would make a mark on a piece of paper and, more occasionally still, move a wander-plug to a different socket in the H.T. battery.

I waited patiently for him to speak. Presently he gave a grunt of satisfaction, muttered something about "saturation point," and switched off the valve filament. Then he turned to me.

"Good evening," he said, "sorry to keep you waiting. I bought a new power valve on my way home to-night, so was just taking its characteristic curve. What brings you round here?"



The Circuit the Expert Drew.

I explained that I was struggling with a wireless problem of great importance to myself, and wondered whether perhaps he might be kind enough to give me a little advice. I thought for a moment that he looked a little bored, but if he was he soon resigned himself and invited me to sit down and "get it off my chest."

After offering him a cigarette (an expensive brand, which I had bought specially on my way to his house), I explained that I had decided to build a new receiver which should be absolutely IT. I made it clear that I was prepared to spare no expense of time or money and would take the greatest care over the constructional work.

"So you see," I finished up, "all I want you to do is to advise me what circuit to use."

"That," said The Expert, "depends entirely upon what you want the set to do."

This puzzled me somewhat.

"I don't quite follow you," I told him. "I want the set to receive,

of course. To receive as well as ever possible. That is all."

"But that doesn't help very much," The Expert explained. "What kind of reception do you want? Loud-speaker or headphones only? Do you merely want the local station at great volume, or are you willing to struggle with the tuning until you get snatches of a distant station through a haze of atmospherics and spark interference?"

Must the set be easy to handle? Are the broadcast concerts your only object, or do you wish to experiment? Then again, do you wish to use two valves or ten? You see! There is no such thing as the 'best' circuit. What is one man's meat is another man's poison. If you will tell me the kind of set you want I'll be able to give you a suitable circuit.

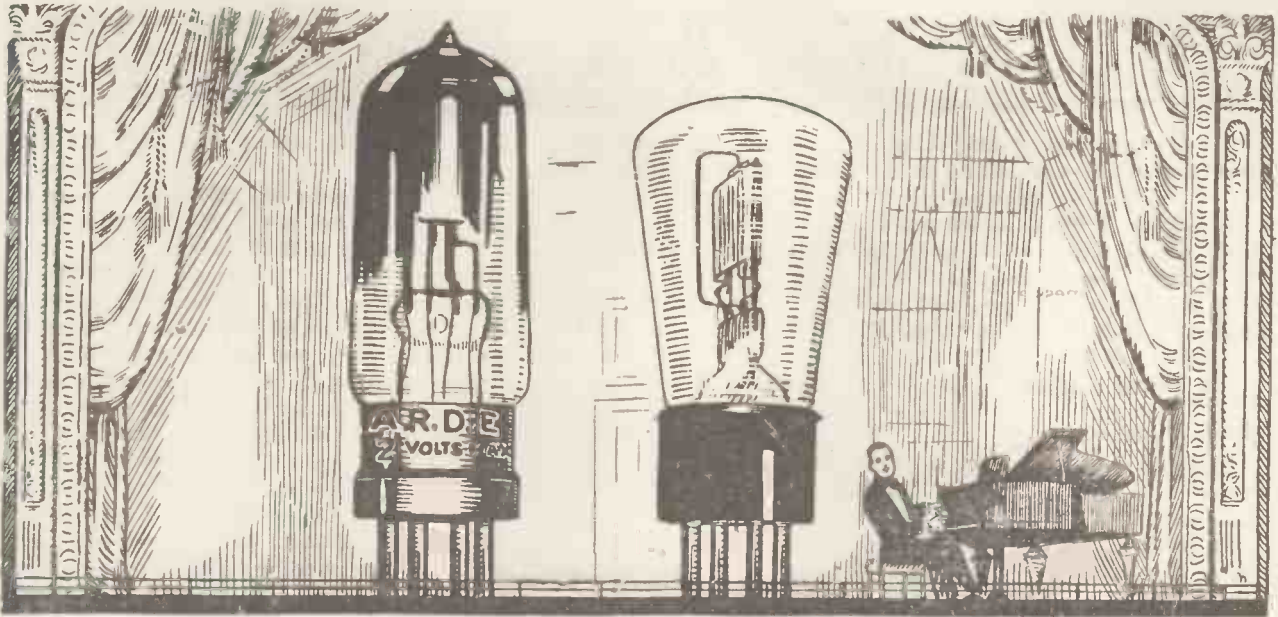
Until you've decided this point I'm afraid I can't help you."

In a New Light

This gave me something to think about, for, to tell the truth, I had never looked at the matter in this light before. However, if I went away to think it over I knew I should find myself in the same dreadful state of uncertainty as before I had come to see The Expert in order to get him to settle the matter; all he was doing was to unsettle it.

"Well," I extemporised, "the set I want to build is one which will be capable of getting all British and Continental stations on the loud-speaker whenever I want them. I should also like to get a few of the American ones if possible. It must be easy to handle, as my wife will want to use it sometimes when I am out for the evening: for this reason I should like it to have as few controls as possible. I particularly want to be able to cut out the local

(Continued on page 512)



Ideal Entertainment by the Ediswan Troupe

P.V.6. : "Hallo ! Fancy meeting you !
I am surprised !"

A.R.D.E. : "I'm more surprised at your
surprise. You should know
better by now. We Ediswans
always find each other in the
end."

P.V.6. : "That's true, my dear, but we
seem to have found each other
remarkably quickly in this case.
Mr. Owner has only had this
set a fortnight, and already
you're here and Miss 'Other-
valve' has gone !"

A.R.D.E. : "Good for you—and for him !
Couldn't you get on with the
lady ?"

P.V.6. : "I did my best. But she was
very trying. However, I'm
chivalrous—it's in the family.
We seem to do more for other
valves than for ourselves."

A.R.D.E. : "They need it. We—we
always work well together."

P.V.6. : "Of course, my dear. But
then, we know each other so
well, and are so sure of each
other's abilities that—well, it
isn't work. It's pleasure."

A.R.D.E. : "That's true . . . and now,
I hear FL . . . the Eiffel
Tower. Let's get Mr. Owner
some pleasure. . . . Ready?"

P.V.6. : "Ever . . . till the end of
my life. . . ."

A.R.D.E. : "Which is, naturally, a long
way off !"

EDISWAN VALVES

Will Improve
ANY Set

Always give a Good Performance.

AT ALL WIRELESS DEALERS

THE EDISON SWAN ELECTRIC CO., LTD., 123-125, Queen Victoria St., London, E.C.4.

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

Finding the Best Circuit for ME! (Continued)

station without any trouble, and I would like switches so that any number of valves can be used. If it will work on a frame aerial and is small enough to be portable so much the better. That's about all I can think of for the moment, and the number of valves I leave to you," I finished, kindly.

The Expert laughed.

An Impossibility

"I only wish that I knew of a circuit like that," he said. "My dear chap, what you are asking is an utter impossibility, at present anyway. You want a set that will cut out the local station at less than five miles, you want to get America, and yet you want it to be so easy to operate that a woman can handle it." (I wished my wife could have heard him say "woman.")

"Well," I replied, a little annoyed, "I am only telling you what you asked me. If I can't have all I want, tell me what circuit would come nearest to doing what I have said." Then an idea struck me. "I'll tell you how we'll settle the argument," I cried brightly. "Suppose that you, yourself, were going to make a set to get all the broadcasting stations in existence. Just give me the circuit that you would use."

The Expert looked at me pityingly.

"And do you think you could work it?" he asked.

"Never mind that," I said, "I'd soon learn. Now please tell me, as a special favour, what is your favourite circuit."

Thus urged, The Expert grew a little more enthusiastic. He took another of my cigarettes, leaned back in his chair, and half-closed his eyes.

"Well," he began, dreamily, "I'd use five valves, all specially picked for the job. That's about as many as could be used efficiently. The first two would be H.F. amplifiers, low-capacity type, and the last two would be L.F. amplifiers. Not power valves, mind you. I only want to hear what is going on, not to blow the roof off. I'd couple the first valve directly to the aerial circuit and get my selectivity by using a loose-coupled H.F. transformer between the first two valves. Tuning

would be quite sharp enough because the coupling between the second H.F. valve and the detector would be tuned-anode. I'd control the H.F. valves with a potentiometer. Not that I'd use much positive bias, but just in case of trouble. I don't think I'd bother about a reaction coil, the set would be sensitive enough without it, but it wouldn't be always on the point of oscillation either, as I'd keep the stray capacities too low for that.

"I wouldn't have any switches on the H.F. side, as I shouldn't want to cut out those valves—I'm not interested in stations only a stone's throw away. It would be better to make the last valve optional, though, as it does more harm than good when you are trying to get a distant station and atmospherics are bad. Three H.T. tapings would be enough, one for the H.F. valves, one for the detector, and one for the two L.F. stages. One grid-bias tapping would do, as I'd take care the last two valves had similar curves."

By this time The Expert was talking more to himself than to me, but suddenly he caught my eye and sat up.

"Yes," he said, "that is the circuit I shall use in my next set. From an all-round point of view I don't think there is anything to beat it."

On Paper

"If you don't mind," I told him, "I should very much like to see what that circuit looks like on paper. Would it be too much trouble to draw it out for me?"

The Expert picked up an old envelope from the table, borrowed my pencil, and rapidly drew out what was, to me, a most complicated circuit diagram.

When he had finished I took it from him and tried to look as though it was as clear as daylight to me.

"Look here," I said, "you've got down three variable condensers. Do you use them all at the same time?"

"Of course," he nodded.

"But how do you do that when you've only got two hands," I asked.

"Oh, you set the aerial condenser to approximately the correct value, and then tune the two H.F. conden-

sers, one with each hand," was the reply.

"But how do you know the correct value for the aerial condenser?" was my next question.

"Well, I suppose it's a kind of instinct," he answered. "After you have had a lot of practice at that sort of thing you can tune-in without thinking about it. However, I might tell you that it would take even me some little time to pick up a new station with this circuit. You would be absolutely lost, even if you had a wavemeter. Besides that, you wouldn't be able to build the set so as to be really efficient. You would probably never succeed in stopping it oscillating. I tell you straight that circuit is quite unsuitable for you."

"I'm afraid it is," I admitted regretfully.

A Four-valve Circuit

"What you want," he announced, "is a nice straight four-valve circuit. There is no reason why you shouldn't be able to manage one H.F. stage, while two L.F. valves will give you plenty of volume. With such a set you could get the local station without the slightest trouble—even your wife could do that—while after a little practice you would be able to pick up several of the others, and even get some of them on the loud-speaker."

"But how about cutting out the local station?" I asked.

"You would be able to do that for those stations working on wavelengths considerably different from that of the local station. Those stations working almost on top of it you would only get when the local station was not working. That needn't worry you, however, you would have plenty of stations to choose from."

"That doesn't seem so bad," I said. "As a matter of fact I did think of trying 'A Set As Good As Money Can Buy,' which was described in THE WIRELESS MAGAZINE. That uses the circuit you are talking about. Do you think it would suit me better than a 'super het'?"

"Personally I don't like 'super hets,'" The Expert told me. "They certainly give results, and are all

(Continued on page 533)

THE NEW VALVE WITH THE IRONCLAD GUARANTEE



America's Foremost Valve
made in
Britain's newest Factory.

C.T. 25 B. For resistance
capacity coupled amplifier.
Amplification Factor 20. 15/-

Perfect Service or instant replacement

Positive Performance or a new Valve. That is the Ironclad Guarantee. So long as there is light and life in a Cleartron this Guarantee holds good. No matter where the Valve is bought any Cleartron Dealer will replace it instantly without cost or question.

Make sure of your Valves.

Cleartron gives you increased volume, greater distance, purer tone, keener selectivity—and guarantees it up to the hilt.

12/6

Cleartron guaranteed Valves consume less current, oscillate, detect and amplify. Types—C.T. 08, C.T. 15 and C.T. 199 (American type) at 12/6.

CLEARTRON RADIO LIMITED
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CLEARTRON

BRITISH  MADE

All Cleartron Valves are Dull Emitters.

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Types C.T. 25, C.T. 25B and C.T. 201A (American type) at 15/-. If your Dealer does not carry Cleartrons, order from us, with your Dealer's name and address.

Service Advertising.

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

How to Prepare Your Panels

The Last of Three Articles



FOR my own work I use a simple yet ingenious tool—a home-made example of the automatic centre punch (see Fig. 22). It consists of a pointed knitting needle with a button at each end and a loose sliding weight in between.

The point is placed on the correct spot, and the weight, previously lifted to the top, is released to provide the centre pop in the panel. This tool requires no skill to obtain the most accurate results.

Checking the Marks

When every hole has been pricked off it is advisable to check them off with the removed diagram and to mark on the front of the panel, against the centre pops, the names of the leading components to which the "pops" refer. I do this (as shown in Fig. 23) with stamp edging, writing on the initial letters before sticking the pieces of paper on. These marks do not damage the panel, and are a guide in the subsequent building up.

The edging is easily removed—indeed, its chief failing is that if not well wetted and pressed on, the labels occasionally fall off.

"Leading" Points

Only a few points need be indicated, enough to arrest the attention as to which is the right way up of the panel when one is fixing on the components. I also mark the back of the panel in a similar manner and sometimes use Chinese white (water paint) instead of stamp-edging for this purpose.

Easily identified points on the back of the panel may save mistakes in wiring-up. The panel need not be turned over every few minutes to ascertain whether this or that terminal is earth, aerial, or the H.T. + or H.T. —. It is quite easy to get a little muddled when working on the back, due to the positions of components being reversed.

Don't attempt to fit components until all the holes are drilled. That sort of procedure only leads to scratched panels and damaged fittings. When all the holes are drilled



Fig. 22.—Pricking-off with an Auto-centre Punch.

certainly lay out the components on the panel to see that no error has occurred and that the holes and clearances are satisfactory.

If any rimering out is required, do

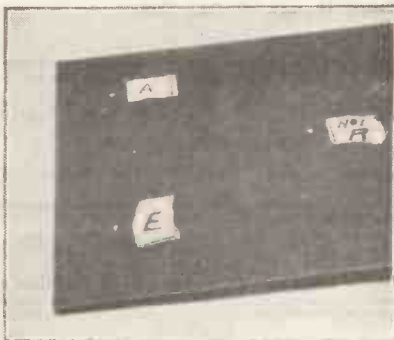


Fig. 23.—Identification Marks on Gummed Paper.

this at one operation for all holes, and then start the assembly.

I am quite aware of the feverish haste which generally imbues the beginner in wireless to get his set

together and tested. The task of making up a receiver is not a long one however deliberately and carefully one proceeds. Therefore avoid slapdash methods; chipped and scratched panels are the inevitable result.

Rimering Out Holes

To enlarge holes drilled undersize a useful tool is a taper rimer, but if it is not available the tang of a file which has been sharpened up by filing will be found quite satisfactory working on ebonite so long as the taper is not too "fast." A long, gradually sloping tang is the most useful.

It is my considered opinion that where a small diagram has to be worked to it is unsafe for even the skilled "marker off" to attempt to reproduce it directly on the panel.

A mistake on paper is easily remedied, but a scribed line on the polished surface of the panel is there for ever.

It is not worth risking it, unless the diagram is reversed and the markings made with square and rule on the back of the panel. There is really not much saving in time by the so-called "direct" method, and I would strongly recommend making a full-size drawing on paper to the dimensions given on the small diagram before touching the panel.

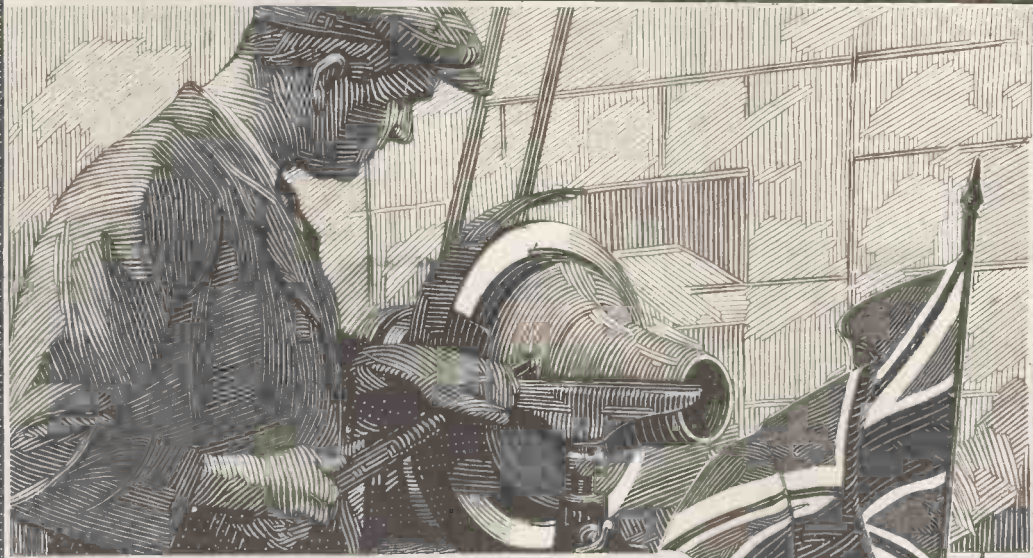
Structographs

With such a drawing the procedure will be the same as when THE WIRELESSMAGAZINE "Structographs" are used. Small diagrams are fully dimensioned, and the full-size paper drawing of the panel may be set out and the positions of the parts identified and marked with dots or rings.

The only articles necessary are a foot-rule and a square, a wooden drawing set-square being the most useful variety for this particular job.

(Continued on page 516)

THE FIRST WIRELESS LOUD SPEAKER WAS A Brown



Such craftsmanship found only in the superb Brown

WE are proud of the workers responsible for the manufacture of Brown Headphones and Loud Speakers. Each one is imbued with one ideal, that every instrument, no matter its price, must be worthy of the great name enjoyed by the Brown throughout the world. Not 'how cheap,' but how good is ever the motive at the back of the Brown organisation.

How this is reflected in the instruments themselves can be seen by anyone. Examine a Brown with critical eye—note its exquisite finish, its plated parts carefully polished, its balance and its harmonious and pleasing outlines. But hear it and at once you'll sense its superiority—instinctively you'll feel that here at last is the interpreter of real radio music. It takes the Brown with its tuned reed mechanism—found in no other Loud Speaker—to give you the true thrill of realism. All Dealers stock Brown Loud Speakers in a full range of sizes.

S. G. Brown, Ltd., N. Acton, London, W. 3

Retail showrooms: 19 Mortimer Street, W. 1.
15 Moorfields, Liverpool. 67 High Street, Southampton
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Cross House, Westgate Road, Newcastle

To the Trade:
In case of difficulty in obtaining supplies from usual sources, write to us at once.

Standing 15 inches high and fitted with the standard Brown tuned reed movement, this new H 3 will give an exceptionally generous volume of tone. Owing to its greater sensitiveness it will give much louder results than any other Loud Speaker of equal size. In resistances of 2,000 or 4,000 ohms

£3

BRITISH

Brown

THROUGHOUT

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

How to Prepare Your Panels (Continued from page 514)

Marking out a panel from a theoretical circuit diagram only requires a little more skill and some ingenuity. Such diagrams are not

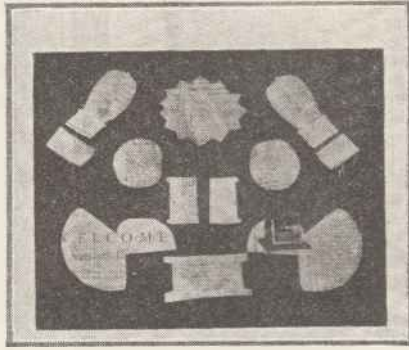


Fig. 24.—Paper Patterns of Components Laid Out on Panel.

to scale, nor do they indicate the relative positions of components on the panel.

The amateur constructor will therefore have to settle positions by reference to the actual instruments and to general practice. Knowledge of the latter can be best obtained by studying the various designs that have already appeared in these pages.

I usually make full-size paper plan-models of the condensers, resistances, switches, valves, holders, and the other fittings to be used (see Fig. 24). I also refer to illustrations of other sets which may be similar in various characteristics and then shuffle the paper templates about on the panel, or on a paper copy of it, until a satisfactory scheme is evolved.

Components with Moving Parts

In making models of variable condensers always show the moving vanes in their extended positions, and remember that shallow fittings like fixed condensers may be made to clear the moving vanes.

The actual position of the set in the room should be considered, determining the best side for the aerial, earth and battery connections, and so on. Care must also be taken that dials and knobs can be readily operated. When you are "crystal fumbling" with a reflex set, you do not want to be constantly short-circuiting the H.T. terminals with the palm of your hand. This and

other conveniences can be quite easily determined with the full-size paper models referred to.

Although I have always used glass-paper for cleaning off file marks, emery paper or cloth can be used. It is a slightly better abrasive, as ebonite, although so soft, requires a hard tool to cut it. This should be noted by those who may attempt to turn ebonite.

Drilling

In drilling, the ebonite and drill rapidly become heated, and if the drill is forced a rough hole will result. Soapy water is a good lubricant.

As I usually screw my terminals in to the ebonite panel, as this retains them in place should the nuts be taken off when the panel is turned upside down, in the connecting

up process, I drill smaller holes in the panel and tap out to suit the thread of the particular fitting to be attached. Soapy water can be used with success to lubricate the tap.

It is also better to let the ebonite cool down and re-harden after drilling, and not to cut the thread immediately following the use of the drill.

Scratched Panel

If a polished panel has been scratched badly by an accidental slipping of a sharp tool, it can be repolished by rubbing with successive grades of emery cloth, finishing with wetted, powdered bath brick and a flannel-covered wooden rubbing block.

This is, however, a laborious process, and I usually finish a panel so damaged with a matt surface.

This can be done by stopping the emery-clothing at any desired stage and finishing with the rubber and a slightly finer degree of emery powder, also applied in a wet state.

HENRY GREENLY.

A SIMPLE AERIAL INSULATOR

THE following description of an easily made aerial insulator will be of interest to those who require something a little better than the small egg-shaped porcelain type, but who do not wish to go to the expense of purchasing a costly manufactured article.

A piece of round ebonite rod of good quality 1 in. in diameter and 6 in. long is obtained.

Drill a hole $\frac{1}{2}$ in. in diameter to a depth of 3 in. from one end, as shown in the diagram (Fig. 1). At the bottom of this hole, drill again to a depth of 1 in. with a $\frac{3}{16}$ -in. drill and tap it with a $\frac{1}{4}$ -in. Whitworth tap.

A piece of brass rod screwed $\frac{1}{4}$ -in. Whitworth is obtained, and one end of it bent into a loop as shown (Fig. 2). This is screwed into the hole in such a manner that a space is left around the brass rod.

The outside of the ebonite rod is now corrugated (Fig. 3). If there is a lathe available this operation may be easily carried out by cutting a series of grooves with a round-nosed cutting tool.

If not, they may be hand cut

with a coarse round file about $\frac{3}{8}$ -in. diameter.

A $\frac{1}{4}$ -in. hole may be drilled in the other end of the ebonite to take the securing rope.

The corrugations considerably in-

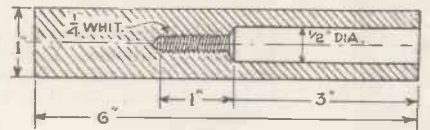


Fig. 1



Fig. 2



Fig. 3

Figs. 1 to 3.—Details of Aerial Insulator.

crease the surface length of the insulator without increasing the actual length, while the clearance space around the brass rod further increases the resistance to surface leakage and to a great extent shields the brass rod from rain and soot.

S. B.



Choose the Wuncell and be money in pocket

EVERY week sees several thousand wireless enthusiasts leaving the ranks of the bright emitter valve users and changing over to Wuncells. And each month these new adherents make a practical saving of several shillings in reduced accumulator recharging fees. But this is not the only economy effected. The new Wuncell possesses a filament having exceptional long-wearing qualities. Owing to the fact that the valve operates at its best when the filament is barely glowing, it is subjected to very few stresses. The Wuncell filament is made under a process known only to Cossor. It is built up layer upon layer. Each layer means additional strength. This process ensures a filament wonderfully productive of electrons—and when allied to the well-known Cossor electron-retaining design of Grid and

Anode, obviously an ultra-sensitive valve is the result.

Now is the time to change over to Wuncells—and start saving money. If yours is a multi-valve Set operated from a 4 or 6-volt accumulator it is unnecessary for you to discard all your valves at once, you can change over one by one as your existing valves become useless. For your convenience the W.R. series of Wuncells has been evolved. These are 1·8 volt valves with special bases which permit the Wuncells being used with 2-volt, 4-volt, or 6-volt accumulators without the slightest alteration to Set. A small in-built resistance controlled by a switch enables the valve being used on any voltage between 2 volts and 6 volts. Get acquainted with these super-economy valves without delay—your dealer can supply you with interesting descriptive folders free of charge.



The Wuncell Dull Emitter
Voltage 1·8 volts. Consumption '3 amp.
W1 for Detector and L.F. 14/-
W2 for H.F. Amplification. 14/-

Wuncell Series WR1 & WR2

WR1 for Detector and L.F. 16/-
WR2 for H.F. amplification 16/-
For use with any accumulator from 2 volts to 6 volts.

The Cossor Loud Speaker Valve W3

Voltage 1·8 volts. Consumption '5 amp.
Price 18/6

Cossor

Valve Sets in Theory & Practice

Tuned-anode Coupling Reaction Potentiometer Control

IF instead of the transformer arrangement in Fig. 5 we were to substitute that shown in Fig. 6, we should have a tuned-anode H.F. coupling.

What a Tuned-anode Is

The tuned-anode coupling is like the primary half of a transformer tuned by a variable condenser and having its connection to the grid condenser of the rectifying valve taken as a branch at a point between the tuned coupling and valve sheath. In a tuned-anode H.F. stage the already amplified signals coming from the anode of the amplifying valve pass up into this anode inductance and set up oscillations in it, just as currents from the aerial set up oscillations in an aerial inductance.

Moreover, just as by tuning an aerial inductance you can make its resistance to the tuned wavelength so great that signals are unable to get to earth by the earth wire, but have to take the branch line through crystal or rectifying valve circuit, so by adjusting the capacity of the variable condenser in the tuned-anode circuit you can impart to this little separate oscillatory circuit an equivalently high resistance for the tuned wavelength. Thus the energy is unable to get past to the H.T. positive wire, but has to go along the branch, there to charge up the plates of the rectifier-valve grid condenser.

Simple, Selective and Efficient

Tuned-anode is very popular as a single stage high-frequency amplifier for broadcast wavelengths, because it is simple, very selective, and gives high amplification for wavelengths about the British broadcasting band (350 to 500 metres). The reason why two stages of tuned-anode H.F. amplification are very seldom built into a receiving set is because each anode circuit has a way of exciting the other until the valves "spill over" and there is a frightful howling set up.

Whenever howling occurs, not only

is it extremely nasty for oneself, but it passes up into the aerial, re-radiates into the air and spoils reception of broadcast for everyone else within a range of two to ten miles.

It has been explained that if the wire from the anode of the rectifying valve of a wireless set is brought back near to either the aerial or closed-circuit inductance and another

The last of three on valves and valve sets, this article is a continuation of our "Absolutely for the Novice" series by Colin Bennett.

The author explains in simple language the whys and wherefores of high-frequency amplification, with a special note on potentiometer control.

coil wired up with it on the way to the phones or L.F. transformer, the inductance and reaction coil will mutually reinforce the energy passing through one another. In the same way a reaction coil may be fitted up to work in proximity to the winding of an H.F. transformer or tuned-anode inductance coil.

This is called transformer or tuned-anode reaction, whichever

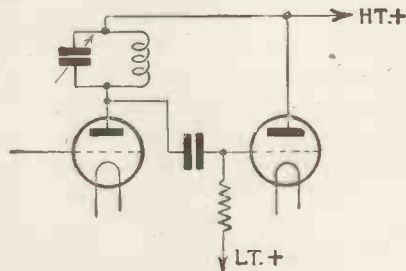


Fig. 6.—Tuned-anode Coupling.

it may be. It has the advantage over aerial or closed-circuit reaction that, though not augmenting the loudness of signals quite so much, it is far less likely to cause serious annoyance to neighbours through re-radiating howling from the aerial.

The above explanatory notes on valve circuits should be taken for what they are, which is no more

than an attempt to set forth in a simple way certain things which in reality are surrounded with plenty of difficulty and not a little obscurity.

Potentiometer Control

If you were to connect together by copper wire the positive and negative terminal of a low-tension battery, you would form a short-circuit along which current from the accumulator could flow so rapidly as to discharge the storage cells at a great rate, and probably spoil them. But if you connected across these terminals a proportionally longer wire having a very high resistance to the flow of electricity you might in that way arrange for the battery to send a small continuous current flow along the wire, though only discharging itself thereby very slowly indeed, in fact not nearly so fast as the lighting-up of the filament of a single valve would discharge it.

A potentiometer is a coil of resistance wire connected across the low-tension battery terminals in this way, the wire coil being fitted with some kind of a slider contact, similar in principle to the slider contact of an aerial inductance.

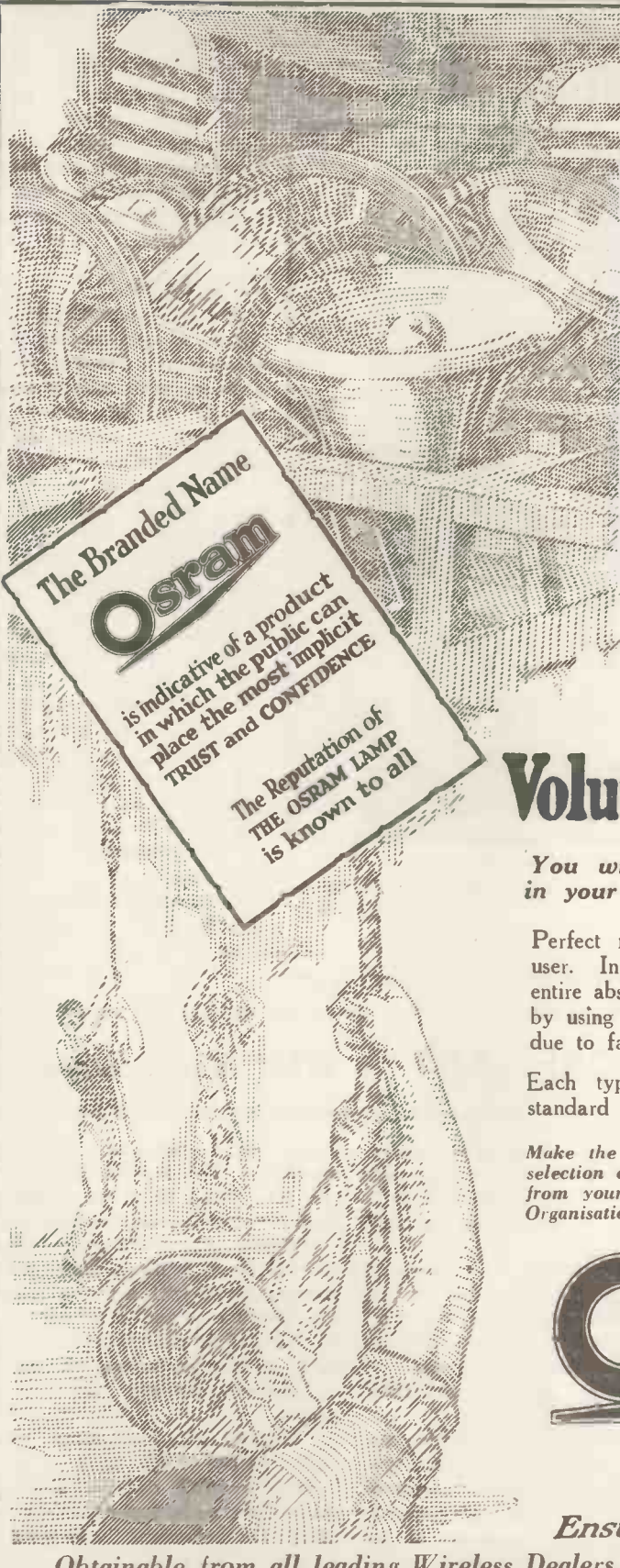
Voltage Control

If this contact is placed at the end of the coil nearest the positive terminal of the L.T. battery, the full voltage of the battery exists between the slider and the other end of the potentiometer. If the contact is moved along the coil the potential difference between the slider and negative end of the potentiometer decreases in proportion to the movement. Thus at half-way along the coil the voltage tapped off by the slider is half the full voltage of the battery.

It will be understood that by means of a potentiometer connected across a battery any voltage between zero and the maximum voltage of the battery may be tapped off and applied to a crystal or the grid of a valve.

In our previous wiring diagram for valve sets (Fig. 3) there are three

(Continued on page 520)



The Branded Name
Osram

is indicative of a product
in which the public can
place the most implicit
TRUST and CONFIDENCE

The Reputation of
THE OSRAM LAMP
is known to all

Why
Osram

VALVES

Ensure Perfect Radio Reception.



Volume without Distortion

*You will be amazed at the improvement
in your set if you use OSRAM VALVES!*

Perfect radio reception is the aim of every wireless user. In other words to obtain maximum volume with entire absence of distortion. Distortion is often caused by using an incorrect type of valve, but more often is due to faults in design and manufacture.

Each type of OSRAM VALVE is made to a standard which ensures perfect radio reception.

Make the OSRAM VALVE Indicator your guide in the selection of the correct type! Copies may be obtained from your local dealer or from the G. E. C. Publicity Organisation, Magnet House, Kingsway, London, W.C.2.

Osram
VALVES

Ensure Perfect Radio Reception

Obtainable from all leading Wireless Dealers, Electrical Contractors and Stores.

Valve Sets in Theory and Practice (continued)

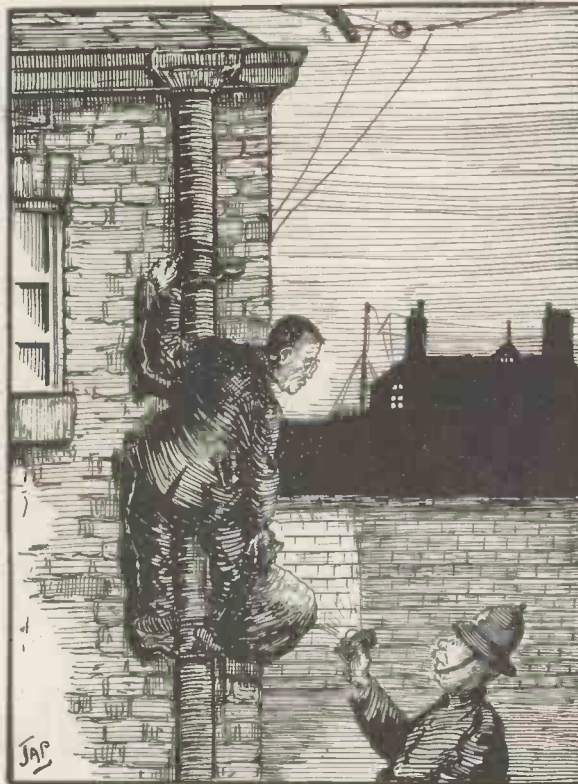
points where parts of the circuit are shown connected up in a manner not immediately self-explanatory: (a) The earth side of the aerial has been shown connected up with the negative terminal of the low-tension battery; (b) the output side of the secondary winding of the high-frequency transformer has also been shown connected up with the negative wire from the low-tension battery, and (c) the earth side of the grid leak in Fig. 4 has been shown connected with the positive low-tension wire.

Bright Signal Reception

All these wiring arrangements were selected because they generally make for bright signal reception, but they are rough-and-ready arrangements. With each of them a finer adjustment, and better signal reception, would be effected by bringing the wiring instead to a separate potentiometer bridged across the low-tension battery terminals.

For complete potentiometer control of the H.F., detector and L.F. three-valve circuit this

IN THE FASHION!



Constable: "Hello! what's the game there?"

Cat Burglar: "Well, to tell you the truth, guv'n'r, I've just been up a-fixing of me harriel, an' a deal o' trouble I've had wiv it."

in for broadcast reception each potentiometer would have to be adjusted. The idea sounds complicated to many wireless amateurs, but in practice potentiometer control is simple.

Little Space

If a good potentiometer is chosen it takes up no more space than a filament resistance, while the rate of wastage of current round its windings is approximately one-fiftieth of an ampere only during the time the set is in operation, equivalent to about one-thirtieth of the current required to heat the filament of a single R receiving valve.

The advantage of potentiometer control is two-fold. Not only does it cause the rectifier (detector) valve to act considerably better, and help toward louder, clearer results, but potentiometer control at the earth side of the set, and on the input side of H.F. transformer secondary windings, helps to prevent howling, so that tuning can be taken to far greater

would mean mounting three potentiometers, and in the act of tuning-

sensitiveness for weak signal reception.

COLIN BENNETT.

THE WEATHER FORECAST & What Might Happen

MR. SETDELUX, keen man of business that he was, welcomed the proposal to broadcast news of the prevailing weather conditions over the great city during foggy weather. He lived in a large mansion some thirty miles from town, and his train service during the busy hours of the morning was limited to one train per hour.

"Ah!" he said to his good wife, who had persuaded him to install his multi-valve set in a cabinet of a periodicity which tuned with the periodicity of the rest of the listening-in-room furniture.

His good wife waited the requisite three minutes her husband required for speech after thought.

"Ah!" he said. "I will get Wilkins

to listen-in each morning at 7 a.m. If fog is reported, I will catch the 8.5, my dear, instead of the 9.2."

"Very good, Napoleon," replied the lady.

Wilkins received his orders. A week later, Mr. Setdelux was aroused by his faithful retainer at 7.5 a.m.

"Thick fog over the city this morning, yer honour," he said.

"Very good, Wilkins. Breakfast at 7.25, the car at 7.57."

Mr. Setdelux leaned back with satisfaction on the cushions of a corner seat in a first-class compartment on the 8.5 up. His large-capacity cigar broadcast indications of his affluence to his unknown fellow travellers.

"Wireless is a wonderful help

to the man of business," he said to himself. "This fog-warning idea is the best thing they have done. I shall never be late at the office now."

He took the underground from the terminus to his business house. Arriving there with a perfectly clear sky above him and a brilliant sun, he was just in time to speak to the night watchman coming off duty.

"Where's the fog, Smith?" he asked.

"Cleared off just afore eight, sir," was the reply.

Mr. Setdelux decided to while away the time he had at his disposal before the arrival of the first of his employees by paying a call on the weather man at the broadcasting station.

BOSPHOR PRONZ

Two outstanding developments in Radio Design



Polar-Twin

A Two-valve, single dial, Loud Speaker Set, at a remarkably low price, and without any complications.

The Polar-Twin Set is for use with dry cells or accumulators, can be switched on or off with a single knob, and has a surprising "Loud Speaker" range. It will readily operate a Loud Speaker at a distance of 20 to 60 miles from a main Broadcasting Station, and has even proved effective in loud-speaker reception up to 400 miles. (See letters of testimony in our possession.)

Tuning is Effected with a Single Knob



A unique plug-in Aerial-Reaction coil System is used, and tuning for all B.B.C. short-wave stations is effected on one dial.

The Complete Set at £12 12s. includes the Polar-Twin Receiver, 2 Mullard Polar D.3 valves; 2 H.T. Batteries, 66 v. each, and Plugs: 1 C.A.V. 2 v. accumulator completely charged; 1 Short-Wave Coil Unit; 1 Daventry ditto; 1 Amplion A.R. 38 Loud Speaker and the necessary connecting wires.

Complete £12 12 0

Cabinet as illustrated above, £1 7 6 extra.



Polar-Four

A Four-valve powerful Set with dual tuning systems and a unique system of Remote Control.

The Polar-Four has been designed so that it can be placed inconspicuously in any room or in the garage, etc., and by means of a simple system of triple lead-covered wire and specially designed Jack Boxes the Loud Speaker and Remote Control can be plugged-in and operated from any point of the wiring system. Wherever these are plugged in on the system, complete control can be obtained just as if the Set itself were present.

The Remote Control Box

Permits switching over from one station to the other at will. It also regulates and turns on and off the filament current.



PRICE, without accessories, but with Remote Control and L.S. Jacks, Coil Units for two Stations and Leads, including royalty,

£32 10 0

Polar Service Agents will install, adjust and maintain your Polar-Twin or Polar-Four Set. You can have one fitted within 24 hours. Write for name of nearest Agent and descriptive leaflet, sent post free.

Write for descriptive leaflets and all particulars to

Radio Communication Co. Ltd. 34-35 Norfolk St. Strand, W.C.2.



In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

SO much silk is used in the insulating of components for wireless that the old signal is likely to come into use again — "England expects that every man this day will pay his duty."

At a London sale a shop-soiled valve-set went for 10s. It was not so dusty, after all.

THE B.B.C. are anxious to know exactly what public taste is. They won't need to spend much time in Scotland ascertaining what it is there.

WAVELETS

AN expert says that the best thing to clean crystals with is alcohol. Judging from the statistics of sales, there must be an awful lot of people in Aberdeen with dirty crystals.

AN instrument known as the micro-speakerphone gives a speaker a moving picture of the audience he is addressing. But the intangible nature of the audience, from the

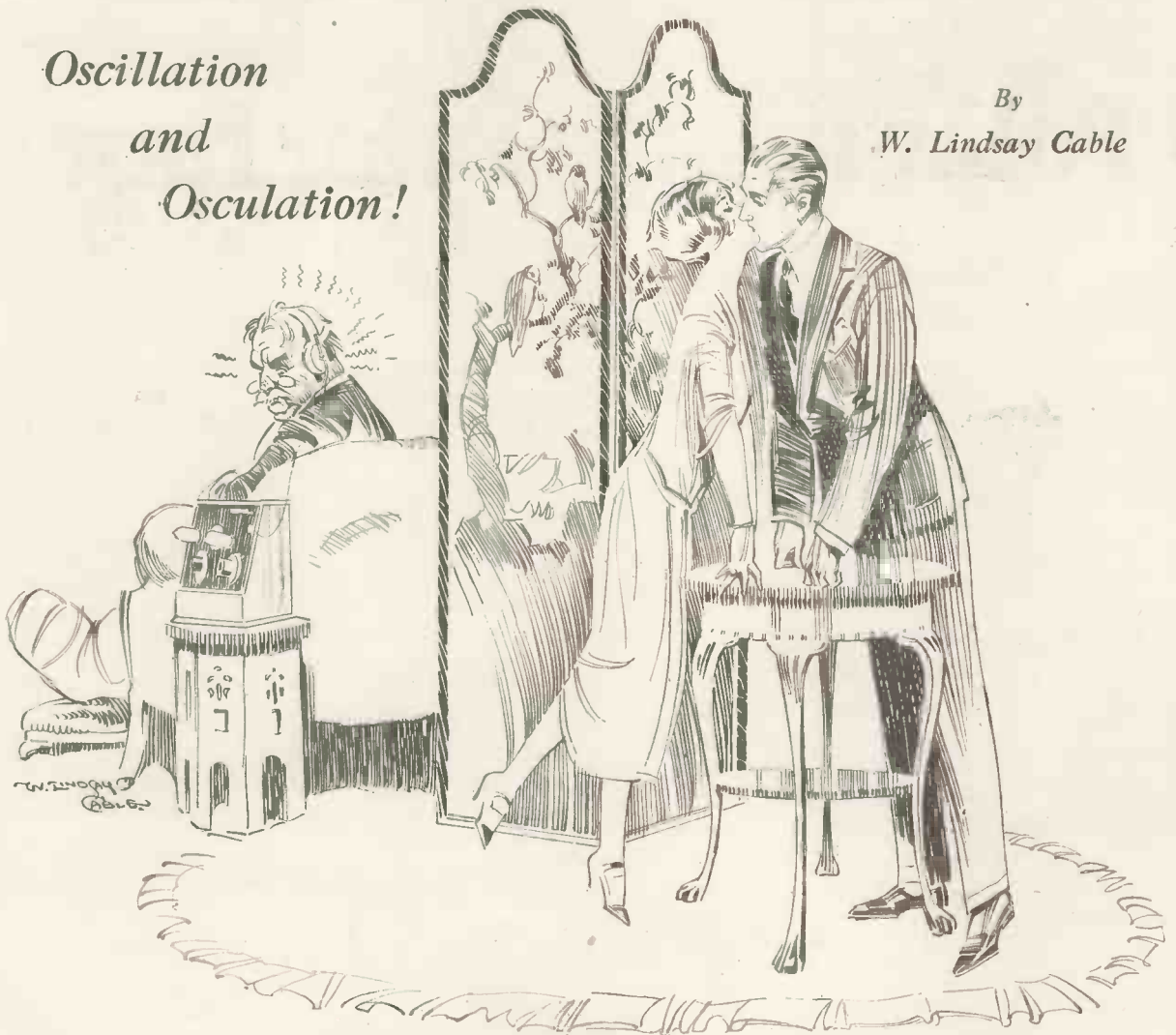
THE University of Illinois has adopted the call sign WIND. We may look forward, therefore, to some breezy talks.

OUR Pussyfoot correspondent writes to say that one of the most frequently used American signs nowadays is DT's.

SOME time ago an experiment was conducted for sorting cigars into various grades with the aid of selenium. Judging by the grades that some hosts hand round, the experiment must have succeeded.

Oscillation and Osculation!

By
W. Lindsay Cable



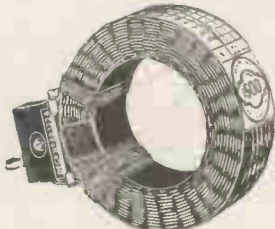
JUDGING from their speeches some of our M.P.'s are very dull-enitters. FISHERMEN are using wireless now in their work. This may account for the loud-speaking characteristics of the fish that finds its way to our market on Saturday night.

point of view of the collection, is not likely to render the contrivance very popular amongst the clergy. SOME day we shall have radio in every room, says an engineer. But up to the present it is little more than a rumour.

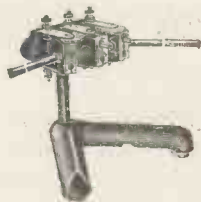
IN answer to correspondents, we are able to say that the Southern Railway *does* get the time signal. Is it not about time we had a strike in wireless circles? There must be lots of "blacklegs" amongst the jazz drummers.



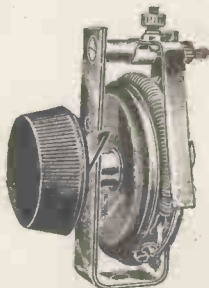
Some
Gift
Suggestions



**IGRANIC
Honeycomb Duolateral Coil**
(Plug mounted) (De Forest Pat. No. 141344)
Low self-capacity. Small absorption factor.
Minimum H.F. Resistance. No dead end
losses. High self-induction. These qualities
of the ideal inductance are found to perfection
in Igranitic Honeycomb Duolateral Coils.
Obtainable in 19 sizes to cover wave-length
ranges from 100 to 23,000 metres. Prices
from 4/3 to 17/6 each.



**IGRANIC
Triplug Coil Holder**
(Pat. No. 225279). For use with Igranitic
Plug Type Honeycomb Coils, it is arranged
to take one fixed and two movable coils.
Finest nickelled fittings, instrument finish.
Price with stand and ebonite operating
handles, 21/-. For panel mounting, 15/-



**IGRANIC
Filament Rheostat**
(Main Type) (Pat. No. 195 03). Supplied
with 4, 6, 8 or 10 ohms resistance. Specially
suitable for highly efficient filament control
and critical control of regeneration. Prices
with fixing screws and drilling template
for panel mounting. Plain type, 3/6.
Also Vernier type, 5/6, and Dull Emitter
type, 20 or 30 ohms, 5/6.

Xmas Gifts that
give lasting
pleasure —



Whether your friends be mechanically or artistically inclined you could not choose for them better Xmas Gifts than IGRANIC RADIO DEVICES. To the radio enthusiast, the excellent performance and perfect workmanship of all IGRANIC RADIO DEVICES—from a grid leak to a splendid outfit for building the Igranitic Six-valve Super-Heterodyne Receiver will be a source of lasting pleasure and satisfaction. To your friend who is keenly appreciative of good music artistically rendered, the broadcast concerts which may be so faithfully reproduced by a set built with IGRANIC RADIO DEVICES, will give sheer joy. By either of them your Xmas Gift is sure of a warm welcome and will be an enduring reminder of your friendship and goodwill. All IGRANIC RADIO DEVICES are built of the best, by the best craftsmen—to give better results.

IGRANIC RADIO DEVICES include:

Honeycomb Duolateral Coils, Variable Condensers, Fixed Condensers, Filament Rheostats, Intervolve Transformers, Variable Grid-Leaks, Variometers, Vario-Couplers, Coil Holders, Potentiometers, Combined Instruments, Vernier Tuning Devices, Switches, Valve Holders, etc., etc., and also the IGRANIC Supersonic Heterodyne Receiver Outfit. All carry the IGRANIC Guarantee.

Write for List Z803.

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RECEIVER OUTFIT



149, QUEEN VICTORIA STREET,
LONDON.

Works: BEDFORD.



In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

What the B.B.C. Is Doing

Specially Contributed by the Officials at 2, Savoy Hill, W.C.2.

THE change in high-power policy, which took effect as from the second week in November, appears to have created considerable stir in listening circles, where the alteration in the arrangement of transmissions from Daventry is regarded as a retrogressive step. It is really nothing of the sort.

When the Daventry station opened some twenty-three million people were brought within range of the service. Of these, ten million, perhaps, were provided with the opportunity of hearing London programmes via 5 X X, to whom that opportunity had previously been denied.

Daventry's Programme

The plan of transmitting from Daventry its own programmes on two, and sometimes three, evenings a week, has not met with the welcome which might have been expected. Instead, this vast new body of 2 L O listeners were attracted chiefly on the nights when 5 X X transmitted 2 L O programmes. London's programmes are the best, they said.

Thus it has come about that Daventry is taking 2 L O programmes on every day except Thursday and a few other days when there is an occasional S.B. from another station. This, however, does not mean that the policy of alternative programmes has received a setback; for we are going ahead with our schemes of power development at other stations, which will widen the field of alternative programmes not merely as from one high-power station like 5 X X, but from several main stations working on high power.

The plan in brief is this: It is now common knowledge that the mystery station, which started operating in October with the call sign 5 G B, and with experimental transmissions on a power of 10 kilowatts, was our old friend Chelmsford, which the Postmaster-General gave the B.B.C. authority to use for the purpose of a series of tests. Those tests were intended, first, to define the potential daylight range of a 10-kilowatt station for crystal and single-valve set users; and secondly, to ascertain

the virtues of different types of transmitters working on short waves and with power varying between three-quarters of a kilowatt and three kilowatts. Those were the chief aims, although other purposes were also examined.

As the outcome of the tests, the aim is to strengthen the five main stations at London, Cardiff, Manchester, Newcastle and Glasgow, to enable them to reach an infinitely greater body of listeners than at present, and further, to enable them to relay, as a regular feature, programmes from Daventry, which may be used as alternative to their own.

It is on this line that the B.B.C. intends acting as soon as the necessary permission is forthcoming.

This step, however, is only the first in a series along which we are working towards the desired goal; and when

that goal is reached, listeners will see a complete revolution in broadcasting. While the raising of power at a station here and there is to be regarded as a temporary expedient only, although, of course, it is of considerable importance, the first big move may be the elimination of all relay stations and the substitution of high-power stations, working, perhaps, on a much higher power than 10 kilowatts, and broadcasting under international control. In that day, no two stations will work in the comparatively confined area of Europe on the same wavelengths.

A few good high-power stations will give better results to listeners than a lot of low-power and relay stations; and crystal set users will probably be very pleased with the change.

One of the essentials in this scheme of transformation may be expected to be a revolution in the crystal set itself. It will become as powerful as the present multi-valve set and of equal sensitivity, but its price will be no higher than now.

Receivers Keeping Pace

One of the main features of the broadcasting policy is the democratisation of the service on an even wider plane than in the past, and our anxiety is to see that the receiving set shall not lag behind, but shall keep pace with the improvements that are being made at the transmitting end.

It can be said that the manufacturers themselves are moved by a similar desire and are working strenuously to produce cheaper and more perfect apparatus.

* * *

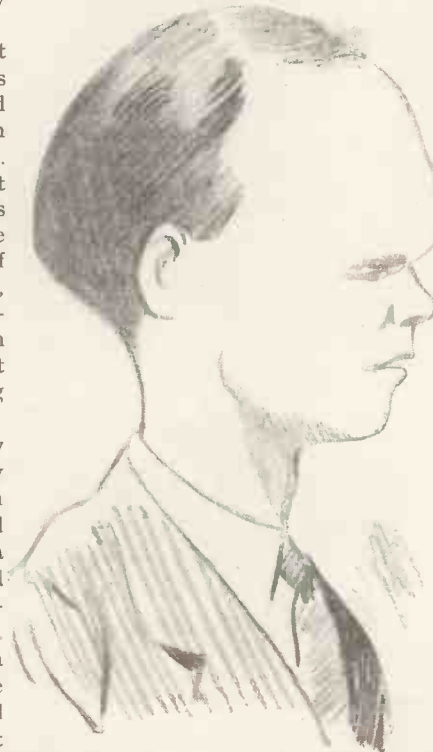
The American attitude as regards compelling the public to pay for broadcasting is that such a move would be undesirable, in the United States, at all events.

The argument is along these lines: The public are not called upon to pay the cost of the magazines and newspapers which they read. Advertising bears the burden there, and

(Continued on page 542)

THE AUTHOR OF "THE LOVE RUSE"

(the story on page 474)



Mr. ALEC WAUGH, as seen by Matt.

"Made Specially to Stay Put"



That is the great difference between the **CLIMAX POPULAR CRYSTAL SET** and the ordinary Crystal Set. It does stay put.

THE **CLIMAX POPULAR PLUG-IN DETECTOR** with the Auto-micrometer catwhisker is undoubtedly the common sense solution of crystal setting difficulties. The unique design based on the stylographic pen point eliminates all difficulties. An independent pressure between the catwhisker container and the crystal surface ensures complete stability.

Another important feature in the **CLIMAX POPULAR CRYSTAL SET** is the high efficiency of the tuning system, which is specially designed "D" shaped variometer, giving remarkably close coupling, wide wave-length variation, fine tuning and good selectivity. Long wave tuning is accomplished by an adjustable plug-in coil giving unusually close tuning. **CLIMAX POPULAR CRYSTAL SET** fitted with Climax Popular Plug-in Detector with the Auto-micrometer Catwhisker and Climax Crystal. Wave-length range 300-500 metres. PRICE 12/6.

CLIMAX POPULAR PLUG-IN DETECTOR, fitted with Climax Auto-micrometer Catwhisker and Climax Superb Crystal. Sold separately. PRICE 3/6 complete with sockets. **CLIMAX AUTO-MICROMETER CATWHISKER** (Prov. Pat. No. 21001/25). Fits all standard Detectors. Sold separately. PRICE 1/-.

CLIMAX SUPERB CRYSTAL. Guaranteed natural galena. PRICE 1/- per box.



"MAKE SURE IT'S CLIMAX."

CLIMAX AERIAL EARTH EQUIPMENT

THE CLIMAX RADIO EARTH.—(Prov. Pat. 17653).—The low-loss direct tubular earth. Far better than the old-fashioned water-pipe or gas-pipe earth. The latest pattern is provided with flanges which break up and help to fill in the earth around the tube, thereby preventing any rocking of the tube in the ground. In addition the projections on the surface of the tube provide water-courses which make for perfect electrical contact. Ready for use. Easily fitted. Maximum efficiency. Length approx. 30 in. Price 5/-.
Climax Insulated Low-Loss Earth Lead. 20 ft. Price 1/8.

The Climax Insulated Shock Absorber Set—for aerial insulation de luxe—One pair of Climax Insulators linked with a Climax Shock Absorber at each end of a single span wire means perfect insulation, while the aerial wire is relieved from sudden strains due to mast sway or halyard rope shrinkage. Each Climax Insulator (Regd. Design No. 708718) will stand four times the flash-over voltage of the ordinary insulator, while it has far less capacity to earth. It will stand a direct pull of hundreds of pounds. It is entirely non-hygroscopic. It cannot absorb moisture even if fractured. IT INSULATES PERFECTLY DURING RAINFALL. It is self-cleaning on all surfaces.

PRICE : One Climax Insulated Shock Absorber Set, comprising four Climax Low-Loss Insulators and two Climax Shock Absorber Springs, 3/- per box. Climax Low-Loss Insulators. Boxed separately, 1/- per box. Climax Low-Loss Aerial, 120 ft., 6/-.

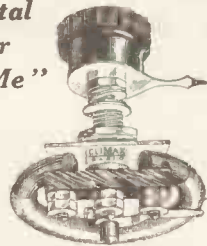
CLIMAX LIGHTNING ARRESTER, made on the multi-gap quenched spark system. PRICE, 7/6, complete, ready to fix.



CLIMAX

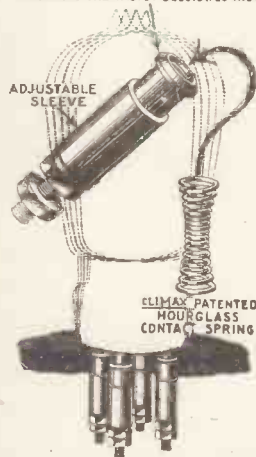
▲ RADIO ▲

"Metal for Me"



CLIMAX METAL-COOLED RHEOSTATS.—The solid rigid resistor means perfect cooling with absolute certainty of adjustment and constancy of its resistance. PRICE : Climax Metal Cooled Rheostat 30 ohm universal pattern for all D.E. or bright valves. 4/- each. 6 ohm heavy duty pattern for one, two or three Bright Valves 2/- each. Climax Potentiometer, 300 ohms, made on the same patented system. 5/- each.

INSULATED HEAD FITS FLUSH ON PANEL PROTECTS THE VALVE: DECORATES THE PANEL



CLIMAX ANTI-MICROPHONIC VALVE SOCKETS (Prov. Pat. Nos. 7399/25 and 17340/23).—Eliminates all mechanical shocks from the valve and ensures perfect electrical contact. PRICE : One set of 4 Climax Anti-microphonic Valve Sockets fitted with patent hour-glass contact springs complete with nuts and washers 2/- per box.

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Constructed on an ingenious mechanical system by which it may be opened or folded in a few seconds. The wire folds into the frame or opens out to its final form without the least trouble. The winding is arranged in two flat coils which are mechanically and electrically balanced. They combine the advantages of the pancake type of winding with the solenoid type.

A centre tapping is provided for use with various special circuits. This frame aerial is very attractive in appearance, extremely efficient in operation, remarkably simple in construction, and is very easily folded into a conveniently portable form. The stand also folds. It is offered at a particularly attractive price.

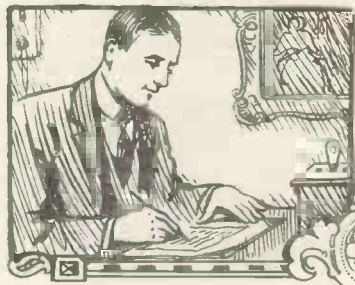
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If you have difficulty in obtaining genuine CLIMAX productions and are asked to accept inferior imitations, kindly send your order direct to us, enclosing P.O. or cheque to the correct amount, when immediate attention will be given to your instructions. CLIMAX RADIO ELECTRIC LTD., Head Offices and Works: QUILLS WORKS, PUTNEY, LONDON, S.W.15. Telephone: PUTNEY 2599. All communications to Head Office. Showrooms: 257, HIGH HOLBORN, LONDON, W.C.1. Tel.: HOLBORN 2538.

Write for the Magazine Catalogue for full details of all Climax Radio Components and Sets. In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.



What the Reader Thinks

Broadcast Tuning Signal

SIR,—I wonder how many of your readers find the tuning note given from the B.B.C. stations a very satisfactory means of adjusting the receiver before the programme actually begins.

I suggest that a much better idea would be a short recital of some kind by the announcer, for I find the voice of a good announcer the very best test as to the correct tuning, and distortion through excessive reaction can be avoided quite easily.

It is very annoying to find, after careful tuning by means of the tuning note, re-tuning is necessary after the opening announcement has begun.—E. Greener (Chertsey).

Indoor-aerial Results

SIR,—After reading the article on indoor aerials in the October number of THE WIRELESS MAGAZINE, I tried one of the experiments suggested, using about 30 feet only of ordinary double-lead flex.

One end was fastened to the aerial terminal, the flex then being hung over the picture hooks and up the stair banister.

My set is a straight-circuit two-valver (one detector and one L.F.). The following results were obtained using a No. 50 coil:

2 L.O., 25 miles distant, at loud-speaker strength; Birmingham (100 miles), and Bournemouth (120 miles), at loud-speaker strength, while Cardiff (200 miles), Newcastle (250 miles), L'Ecole Supérieure (Paris), Postes and Télégraphes (Paris), all came in clearly. Several other stations were heard, including two Germans, but I was unable to identify them.—C. C. Jeary (Bishops Stortford).

A Strange Fault

SIR,—Wireless faults can be very baffling and it is usually the most trivial faults that cause the most annoyance. Some troubles can be seen and remedied, whilst others have to be found by tests, but the fault about to be described was only found by accident.

A three-valve set gave excellent reception during the winter months and was then laid aside during the summer. Later the set was given a clean-up, and a new H.T. battery was fitted. After about a month it was found that the reception would fade for no apparent reason and would come on when the H.T. was varied up or down. This pointed to fault in the H.T. battery, but a voltmeter test showed that the new battery was well up to its work.

At last, during an interval, the owner

happened to put his hand on the top of the H.T. battery whilst fumbling for the leads. The loud-speaker immediately emitted strong signals and the fault was discovered.

Briefly it was this: the little tube which usually forms the socket for the negative wander plug had come away inside the pitch of the battery case, and the lightest touch on the battery was sufficient to remake the broken contact. Of course, each adjustment of the voltage had made contact in this way and the subsequent "easing off" of the pressure had stopped the reception! —H. Ward (Moreton).

A VALVE FOR A LETTER

Have you any interesting comments or suggestions to make on any phase of broadcasting that will interest other readers of THE WIRELESS MAGAZINE?

If you have, then write them briefly on a piece of notepaper (write on one side only, please) and address them to The Editor.

To the writers of the letters published each month we award valves. This month's letter-writers will each receive a B.T.H. valve; next month's writers will be sent a Marconi valve each.

Soldering Made Easy

SIR,—As a reader of THE WIRELESS MAGAZINE, from which I get so much help (as well as from *Amateur Wireless and Work*, now *The Amateur Mechanic*), I have just seen the article by D. F. U. entitled, "How You Should Solder," in the November number.

I know from experience what a wireless set works like if you have a lot of flux about the valve legs, etc. (and it always takes more getting off than on!)

It collects the dust, and then the H.T. or X's get the blame.

I wonder how many readers, like myself, have held a soldering bit on a terminal till it begins to wobble about in a bit of soft ebonite and still the solder will not stick.

By a stroke of luck I bought a soldering outfit which contained a tin of soldering paste named "Britinol."

You simply put a little of this paste (which contains the solder) on each of the parts to be joined, apply a clean tinned bit and the job is done.

If this letter gets into print, I do hope it will not be taken as an advertisement, but as a help to home constructors.—J. C. W. Jones (Hereford).

Reflex Action

SIR,—This letter may be of interest to some of the readers of THE WIRELESS MAGAZINE. It concerns a very common fault with reflex sets, that is, being able to hear as well with the catwhisker and crystal out of circuit as when in.

The remedy in most cases is to apply more H.T. Sometimes, however, this is not effective, as there are different causes of the trouble, as in my case.

I had occasion to remove the crystal detector from the panel and to my great surprise on replacing it the set worked correctly.

The whole cause of the trouble was a little bit of grease and dirt between the soldering tag and nut of the detector—which, incidentally, was rubbed off in the process of removing the detector.—D. Hebb (Nottingham).

Local Interest

SIR.—I was interested to read of the B.B.C. policy of replacing the present relay stations by a few high-power stations.

It would, however, be a big blow to the centres which the relay stations serve if these were dispensed with, for they have a considerable local interest which could never be replaced by more distant high-power stations having to serve a larger area.

Publicity has also been given of late to the inconvenience caused to valve users who are jammed by their local stations. A proposal that each of the relay stations should close down in turn, just for an occasional night for the benefit of these unfortunates, met with a bad reception from crystal users.

Valve users, though in the minority are nevertheless entitled to their enjoyment, and could be given it in proportion to their numbers. That is, if one out of every 100 listeners to a station is a valve user whose set is practically useless because of the local station, then the latter should close down for one night out of every hundred, to give him a chance.—D. R. Halson (Hull).

A Valve Record?

SIR,—In your excellent journal I have often read of records of various types. I wonder if any of your readers can beat my record with valves.

I obtained three ordinary bright-emitter valves in February, 1924, and have used these regularly six days a week (average), and they are still as good as ever.

Only ordinary rheostats have been used, although I have taken care not to move the valves out of the holders more than necessary. Can anyone beat this record?—R. A. Hamilton (Leeds).

For Perfect Radio Results



GECOPHONE COMPONENTS

GECophone Components include: condensers, variometers, transformers, rheostats, coil-holders, coils, reactance units, crystal detectors — and everything for every radio need.

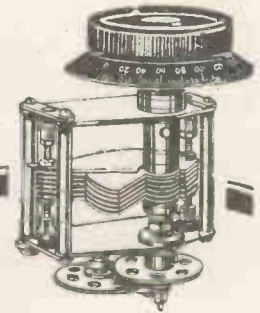
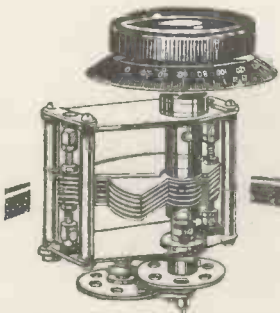
Good components are not only cheapest in the long run—from the first they repay investment by giving the very finest results of which your set may be capable.

That GECophone Components give results which cannot be bettered and are seldom equalled is a fact that any user will gladly confirm. Skilled design and conscientious manufacture are the reasons for this admitted supremacy—qualities ever firmly associated with the name GECophone.

For economy's sake, for satisfaction's sake, fit the best in your set at first—insist upon GECophone Components.

Sold by all GECophone Service Depôts, Wireless Dealers and Stores.

Ask your dealer for Booklet B.C. 3759, which illustrates and describes the comprehensive GECophone component range. For particulars of GECophone sets see Booklet B.C. 3772.





I HAVE been doing quite a good bit of late night—or early morning—transmitting and receiving recently and, as a consequence, I am pale and wan for lack of sleep. Also I am consumed with envy for those stalwarts who go “on the air” night after night at some time between midnight and three in the morning, and do it very nearly every night in the week. I often wonder whether the average BCL has the faintest idea of the lengths to which enthusiasm will lead the amateur transmitter.

In the Early Hours

The man who wishes to be QSO—which, being interpreted, means “in communication with”—America, for instance, must work in the early hours of the morning unless he is one of those rare individuals who can make a 20-metre transmitter work efficiently. 20-metre signals seem to travel well in the daylight, but with all others a certain amount of darkness, preferably darkness all the way, is necessary for really long-distance work. Also the amateur transmitter is very much restricted as regards the hours he can work by Post Office regulations, made in the interests of broadcast listeners mainly.

He is further restricted by his own decent desire not to interfere in the smallest way with the pleasure of the many thousands to whom listening to broadcast is a fascinating hobby. If all BCL sets were really efficient, a large number of transmitters in not too crowded areas could work on the lower wavelengths without any danger of interfering with the broadcast belt; but most broadcast sets are woefully flat in their tuning, and so the amateur transmitters do not start work until broadcast has finished. This is a real sacrifice on the part of the amateurs because transmission is allowed on the 150-200 metres band at any time of the day and night.

Transmission to places outside the British Isles is only allowed between midnight and 8 a.m., and for a few hours during the day on specified days of the week.

Generally speaking the amateur transmitter does not start work until most people have gone to bed, or else he gets up in the early hours of the morning to carry on his experiments. Of course, the amateur transmitter does it to please himself, but his work has been most valuable in calling attention to the extreme usefulness of the short waves. But for the work of the amateurs it is more than probable that short-wave working would still be regarded as impossible over anything but the very shortest distances.

Learning to Transmit

I often have letters from people who are smitten with the idea of transmitting, and want to know how they can learn what to do, and how to do it. Setting aside altogether the difficulty of persuading the P.M.G. that you are a fit person to be entrusted with a transmitting permit, the difficulties of finding out how to work transmitting apparatus are quite enough to choke off all but the real enthusiast. There is very little published information of a practical kind, and unless one has more than a working knowledge of high-frequency electricity and the various methods of generating oscillations, one's path is apt to be beset with thorns.

One or two wireless societies have transmitting sections where the would-be transmitter can learn a very great deal, but we have, as yet, no such scheme as they have in Germany where definite stations have been set up for transmitting on wavelengths below 300 metres, and where amateurs can be instructed provided that they join the society owning the station.

Of course, in this country, the very

best thing that either transmitters or would-be transmitters can do is to join the transmitter and relay section of the Radio Society of Great Britain. If they are within easy reach of London they can attend the meetings of the section and make friends with old hands who will tell them a great deal. In any case they receive the “T. & R. Bulletin,” which contains a wealth of information about transmitting and receiving on short waves.

Calibrating

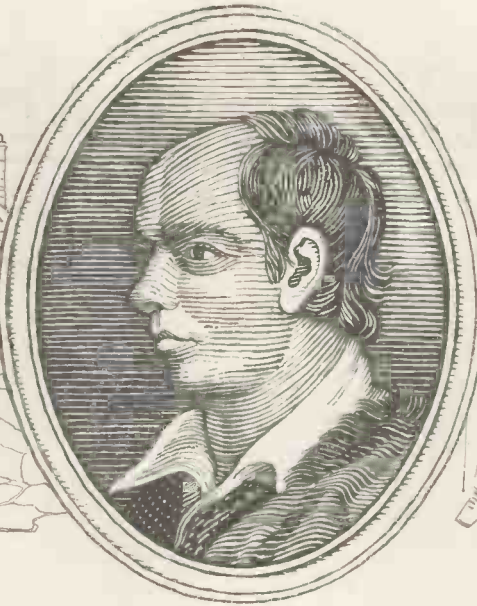
The calibration of a short-wave set often presents difficulties, particularly if there is no wavemeter handy that will work down to the wavelength required. But it is often possible to find some spots of known frequency.

Amateur transmitters will usually say on what wavelength they were working at any given time, and it is worth while to fix on one or two, whose addresses can be obtained from the published directories, and ask them, enclosing a penny stamp for a post-card reply. The harmonics of long-wave stations will give useful data, provided they can be identified.

Over a large area in the south of England the harmonics of GGB at Aldershot can generally be heard. This station works on 1,900 metres, sending out slow morse between 8 and 9 p.m. every weeknight. Its tenth harmonic is on 190 metres. On my short-wave set I have used all its harmonics from the 7th to the 15th to check calibration made with my heterodyne wavemeter.

Short-wave work owes much of its fascination to the many little difficulties which crop up. These difficulties can usually be got over with patience and a little ingenuity by the man who has some experience of working on the broadcast band.

— 5 Y M.



LAWRENCE STONE

*"I love everything that's old—old friends,
old times, old manners, old books, old
wine."*

OLIVER GOLDSMITH

and to the smoker there is no more
constant, steadfast, trusty friend than

PLAYER'S Navy Cut Cigarettes

MEDIUM STRENGTH

WITH OR WITHOUT CORK TIPS



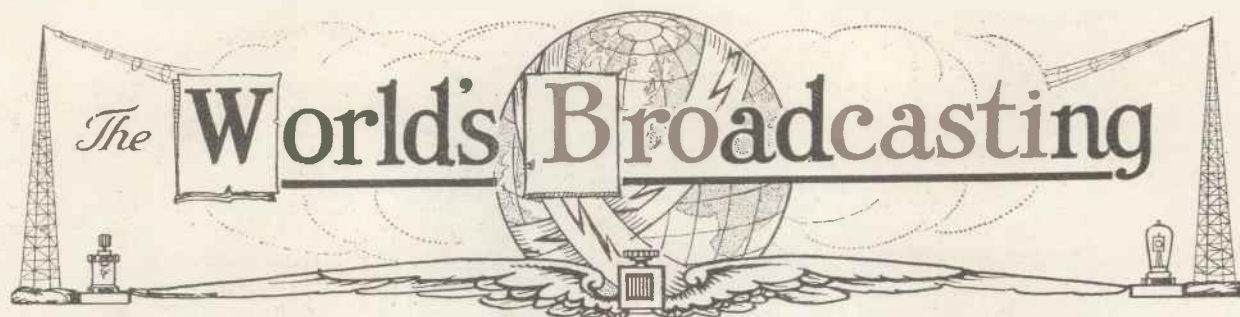
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221	Karlstadt	S M X C	434	Radio Toulouse	—	565	Buda-Pesth (Csepel)	—
241	Stettin	—	440	Belfast	2 B E	575	Aalesund	—
243	Eskilstuna	—	446	Stuttgart	—	576	Berlin (Vox Haus)	—
251	Gleiwitz	—	450	Moscow (Trades Union Council)	—	730	Brünn	O K B
259	Elberfeld (relay)	—	454	Leipzig	—	850	Lausanne	H B 2
260	Norrkoepping	S M V V	458	L'Ecole Sup.	P T T	875	Grenoble (relay)	—
265	Brussels	—	460	Barcelona (Radio Catalana)	E A J 13	940	Leningrad	—
265	Joenkoepping	S M Z D	463	Königsberg	—	1,000	Kiev	—
270	Malmo	S A S C	467	Linköping	—	1,010	Moscow (Popoff)	—
273.5	Cassel (relay)	—	470	Frankfort-on-Main	—	1,050	Hilversum	H D O
280	Radio-Lyon	—	479	Birmingham	5 I T	1,100	Geneva	H B 1
283	Dortmund (relay)	—	480	Lyon-la-Dona (relay)	—	1,100	Haeren	B A V
286	Gothenburg	S A S B	482	Swansea	5 S X	1,150	Ryvang	—
294	Dresden (relay)	—	485	Munich	—	1,250	Karlsborg	—
301	Sheffield	6 F L	488	Riga	—	1,300	Königswusterhausen	L P
302	Berne	—	495	Aberdeen	2 B D	1,350	Boden	S A S E
306	Stoke-on-Trent	6 S T	505	Berlin (Vox Haus)	—	1,450	Moscow	R D W
310	Bradford	2 L S	515	Zurich (Höngg)	—	1,600	Daventry	5 X X
310	Toulouse (relay)	P T T	530	Vienna (Radio-Wien)	—	1,650	Belgrade (Rakovitz)	H F F
315	Liverpool	6 L V	545	Sundsvall	S A S D	1,750	Radio-Paris	C F R
318	Radio Agen	—	546	Strasnice	A D	1,955	Amsterdam	P C F F
325	Barcelona	E A J 1				2,400	Lyngby	O X E
325	Gefle	—				2,650	Eiffel Tower	—
326	Nottingham	5 N G						
327	Milan	—						
328	Edinburgh	2 E H						
331	Dundee	2 D E						
335	Hull	6 K H						
338	Plymouth	5 P Y						
340	Copenhagen	—						
340	Nuremberg (relay)	—						
343	San Sebastian	E A J 8						
345	Bloemendaal	—						
345	"Le Petit Parisien"	—						
345	Trollaattan	S M X Q						
346	Leeds	2 L S						
350	Marseilles (relay)	—						
350	Reval	—						
350	Seville	E A J 5						
353	Cardiff	5 W A						
355	Salamanca	E A J 22						
360	Cadiz	E A J 3						
363	Valencia	E A J 24						
364	London	2 L O						
370	Falun	S M Z K						
370	Helsingfors	—						
373	Madrid	E A J 7						
375	Moscow (Radio Peredacha)	—						
378	Manchester	2 Z Y						
382	Oslo	—						
383	Bilbao (Radio Vizcaya)	E A J 11						
386	Bournemouth	6 B M						
392	Madrid (Radio Iberica)	E A J 6						
395	Hamburg	—						
404	Graz (relay)	—						
404	Newcastle	5 N O						
409	Bratislava	—						
410	Münster	—						
415	Bilbao	E A J 9						
416	Breslau	—						
422	Glasgow	5 S C						
425	Rome	I R O						
428	Stockholm	S A S A						

Reaction and the Loud-speaker

Getting Good-quality Reproduction

WHEN we are using telephones with a small set we can often employ a fairly large amount of reaction without experiencing any great degree of distortion or wooliness. But when the loud-speaker is in service great care must be exercised in the use of reaction.

Reproduction Spoilt

Over and over again one comes across receiving sets whose performances are being utterly ruined by misguided efforts to make signals just a little bit louder than they ought to be.

It must be remembered that when the set is near the point of oscillation it is in its most sensitive condition. It is then liable to pick up parasitic noises of various kinds, and particularly those due to the tiny atmospherics which are always occur-

ring in the air. It is these minute discharges which cause the rustling noise that occurs just before the set breaks into actual oscillation.

Clarity—Not Volume

When using a loud-speaker, clearness and not loudness should be the criterion of reception. If you cannot make your signals as loud as you would like them without making extensive use of the reaction coil, then your set is not really big enough for its work.

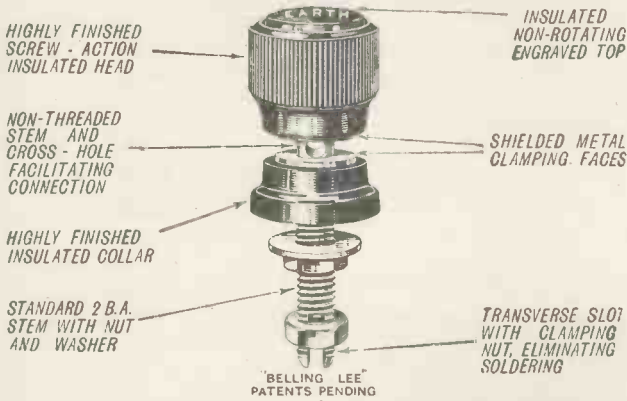
You will obtain far better results by dispensing with reaction altogether and adding another note-magnifying valve, preferably resistance-capacity coupled.

J. H. R.

RATHER a lot of wireless fans are ventilating their grievances just now.

"BELLING LEE" INDICATING TERMINALS

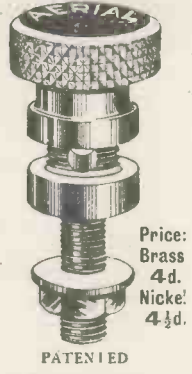
INSULATED TYPE
Non Rotating Names.



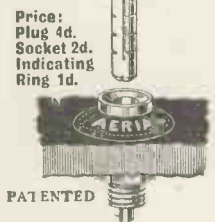
ALL METAL PARTS HEAVILY NICKELLED.
INSULATED PARTS OF GENUINE POLISHED BLACK BAKELITE
Price: 9d. each.

INDICATING TERMINALS Metal Type

Stocks of all varieties are held as follows:
Aerial, Earth, Phones +, Phones -,
L.T. +, L.T. -, H.T. +, H.T. -,
Input +, Input -, Output +, Output -,
L.S. +, L.S. -, Grid +, Grid -,
A.T.I., Reaction, Ap. Aerial, H.T.
Medium and Blanks.



Internal Metal Chuck to grip 14 to 44 gauge wire or flex.



PLUG & SOCKET TERMINALS (M.K. PATENT)

1. Six spring contacts.
2. Have no loose parts.
3. Soldering lug on socket; will also grip a sub-connector.
4. Indicating rings are dome-shaped.
5. All metal parts are nickelled.

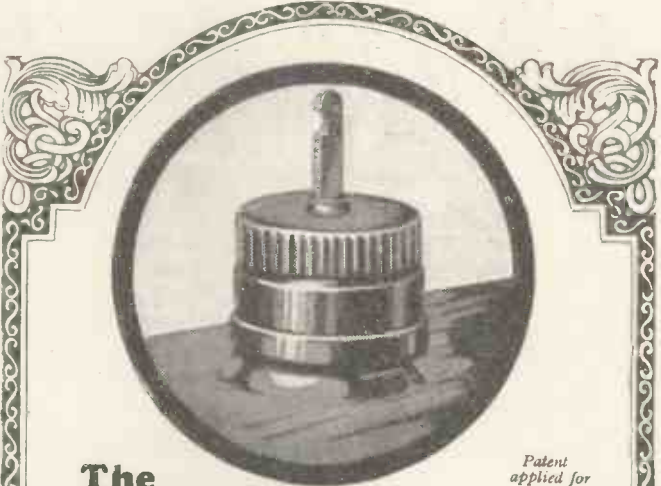
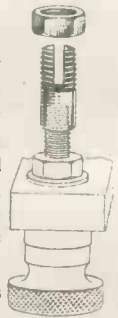
DIAL INDICATORS



Solid cast metal, with raised, polished letters showing white on a black background. Single hole fixing, complete with nut. Stocked in Tuner, Filament, Reaction, Aerial, Anode, H.F. Tuner, Secondary, Rejector
Price - - 6d. each.

SUB-CONNECTORS Eliminate Soldering

Perfect connection; lowest possible self-capacity; low resistance; connection changed in an instant. Tapped to screw on to 2, 4, 5 and 6 B.A. threads; also T connectors for joining wires.



The New Duplex Terminal

WHILE it has not been found possible to improve the design of the T.C.C. Mansbridge Condenser, important alterations have been effected in the actual metal case. The new T.C.C. Mansbridge is fitted with Duplex terminals. A quick connection can now be made by means of the milled head. Soldering can still be carried out—a lug being fitted as shown.

One further improvement to be found in the use of a metal top instead of a pitch sealing compound. Thus the danger of heat affecting the Condenser during soldering is now completely abolished. Once more T.C.C. demonstrates its ability to lead the way in condenser design—its 20 years' experience places it in a unique position for building genuine Mansbridge Condensers accurately and economically. T.C.C. Mansbridge Condensers are now supplied in green metal cases in all values from .005 mfd. to 4 mfd. Your Dealer stocks them

Get the new T.C.C. Mansbridge



T.C.C. Mansbridge Condenser

Every high-class dealer stocks them, but in case of difficulty send to BELLING & LEE, Ltd., Queensway Works, Ponder's Fnd, Midx.

Advertisement of Telegraph Condenser Co. Ltd., Kew, Surrey. Gilbert Ad. 3730

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

What Readers Think of Our Sets

Special Reinartz Two-valver

I THOUGHT you would like to know the results obtained with the special Reinartz two-valve receiver described in the March issue of THE WIRELESS MAGAZINE.

My aerial, of the double T-type, is very badly screened, being surrounded on every side by tall buildings. It is 50 ft. long, 10 ft. high at one end and 20 ft. high at the other. With the set I have received Glasgow, Bournemouth, Newcastle, Manchester, London and 5 XX at comfortable loud-speaker strength. All the other B.B.C. stations are loud on phones, as also are Hamburg, Breslau, Nauen, The Hague, Rome, and Bordeaux (France).

The American stations K D K A and W G Y have also been heard clearly enough to be understood. No difficulty was experienced in separating other stations from Glasgow, the local station.—Wm. M. Cameron (Hamilton).

* * *

Thinking that you would like to have some reports as to the results obtained by one of your readers on the special Reinartz two-valver, I venture to say that it is the best two-valve circuit I have tried.

I have kept a small log of the stations received, which include Newcastle (full loud-speaker strength), Aberdeen, Glasgow, Bournemouth, Manchester, London, Cardiff, Radio Belgium, two French stations unknown, and four German stations, also Leeds (relay) testing.

I have not made any attempt at receiving America yet. The set is the most selective I have ever handled.—R. Hedley (Backworth).

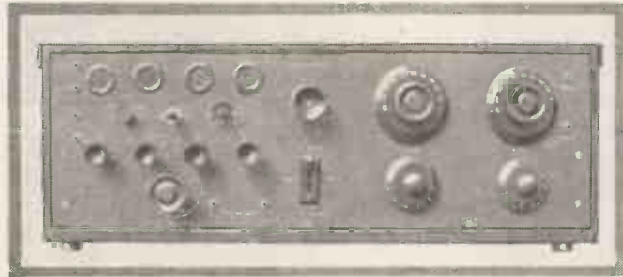
* * *

I constructed the special Reinartz two-valver as described in your March issue.

It is highly satisfactory in every

way, both for selectivity and volume. As for range, I have received nearly all the B.B.C. stations and many foreign ones, including Hamburg, Brussels, Madrid, and Petit Parisien. Others have not yet been identified.

I am situated about two miles from Hull, which I can cut out, and receive the others without inter-

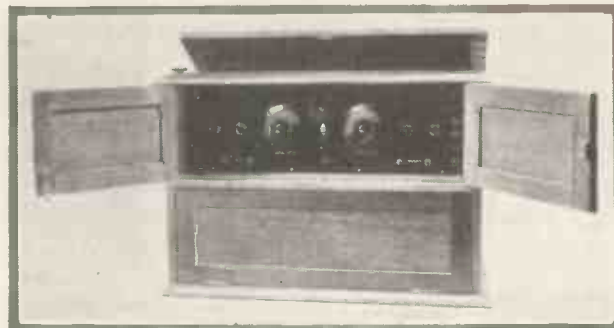


The set, "As Good a Set as Money Can Buy," as made by Mr. T. R. T. Evans, of 102 Aberdeen Road, Goodmayes, another satisfied user.

ference, including Cardiff and Manchester.—J. Farnaby (Hull).

Beginner's One-valve Set

May I congratulate you on the design of "A Beginner's One-valve Set" described in THE WIRELESS MAGAZINE for April? I made this set up as per instructions and within five minutes I logged five B.B.C. stations, the local station (2 L S) coming in at such strength as to be heard comfortably loud on an Amplion Dragon loud-speaker.



"As Good a Set as Money Can Buy" constructed by Mr. E. S. Griffiths, of Belle Vue Hotel, Aberystwyth. Mr. Griffiths is highly satisfied with the results attained, and considers them well worth the time and trouble taken in construction.

After the B.B.C. station had closed down, three continental stations came through quite loudly enough to be heard by all but a deaf person. The set will also work without aerial,

and with the earth wire connected to the aerial terminal. I have also tuned-in the local station (10 miles away) without an earth at all.—S. Hodgson (Wakefield).

"As Good a Set as Money Can Buy"

I am writing to congratulate you on the set "As Good a Set as Money can Buy," designed by the technical staff of THE WIRELESS MAGAZINE, and described in the February issue.

It is, as you say, "as good a set as money can buy." Both the aerial and reaction coils are inside the cabinet and all terminals at the back of cabinet, which makes the set look very

elaborate and tidy.

I am 62 miles from London and 50 miles from the nearest broadcasting station, that is, Bournemouth. All the B.B.C. stations come in at good loud-speaker strength, and also most of the continental stations.

Dull-emitter valves, two A R D E and two D E R, are used. My aerial is a 40-ft. twin aerial, with 16 ft. lead in, and the earth is a Climax tube, the lead to which is 20 ft. long.—C. W. Briand (Micheldever Station, Hants).

"A Selective One-valve Set"

I have tried the selective one-valve set described in the March issue of THE WIRELESS MAGAZINE, and am quite pleased with it. I am able to receive every main B.B.C. station, one or two relay stations and some foreign stations.

Cardiff, thirteen miles away, comes through at good loud-speaker strength. My aerial is slung from the chimney to a tree, and

I find that if I lower it on the tree side Cardiff is slightly better. If I put it higher Manchester, Bournemouth and Newcastle come through slightly better.—L. Sketch (Maes-y-cwmmer).

Finding the Circuit to Suit ME! (continued from p. 512)

right for those people who are only interested in results (you, for instance), but to me it doesn't seem exactly sporting to use them. It is like using violence to replace skill. I'll back my circuit against a 'super het' any day, if the same number of valves are used in either case. I choose five valves because that is the greatest number that can be used efficiently."

"Do you mean to say that 'super hets' really are capable of the wonderful ranges claimed for them?"

"They certainly will receive over very long distances, though I refuse to admit that the ranges are wonderful, when you take into account how many valves are used," was the reply.

"Would a 'super het' be easier to handle than your five-valve circuit?" I now wanted to know.

"Oh, yes," was the answer. "You can have an eight-valve 'super het' with only two tuning controls."

"What about the one-valve supers? The Armstrong or Flewelling? I have read that they will work a loud-speaker; is that correct?"

"Nothing could be more misleading," was The Expert's decided reply to this question. "The super-regenerative circuits can only be satisfactorily handled by a person with considerable experience. They can be made to work a loud-speaker, but the result is not very pleasant. They are not very suitable for broadcasting on account of the continuous high-pitched whistle and considerable distortion which is characteristic of these circuits."

The Expert now glanced at his watch; I took the hint and rose to my feet.

"Well, I thank you very much indeed," I said, preparing to go. "I will think it over and decide between the four-valve straight circuit and the 'super het.' All the same," I continued, catching sight of the old envelope and picking it up, "I should like to take this with me if I may."

* * *

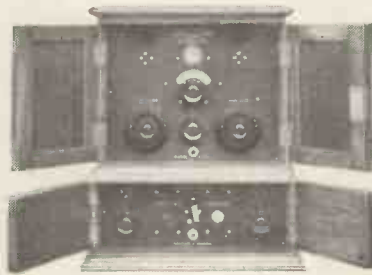
I have not yet decided, but, do you know, I have half a mind to ignore The Expert's warning, and see what I can do with his own favourite circuit! J. F. JOHNSTON.

Fellows Wireless

SAVE 6/8 IN THE POUND

By buying direct from us, you save the middleman's profit. What previously cost 20/- you can now obtain for 13/4. All goods are fully guaranteed, and sent packing free carriage forward on seven days' approval. Fill in coupon below, and forward with remittance.

GRAND FOUR-VALVE SET



Complete with H.T. Battery, 6 v. 40 a.h. Accumulator (25/-), Headphones (11/6), Aerial and Insulators (3/6), four Louden Valves (4/6 each), and Marconi royalty included **£16 0 0**

Mounted in two handsome cabinets one on top of the other and fitting perfectly. Circuit comprises H.F. Detector and two L.F. Staves, the whole forming an extremely powerful and compact Loud Speaker combination. Either cabinet may be had separately. Write for particulars.

Set only (with H.T. Battery and Marconi royalty included)

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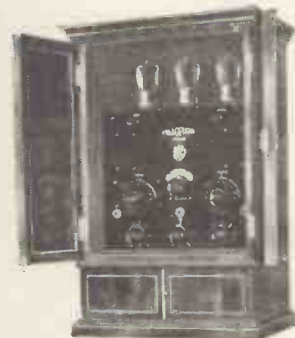
GRAND THREE-VALVE SET

Complete with H.T. Battery, 6 v. Accumulator (25/-), three Louden Valves (4/6 each), one pair of Headphones (11/6), Aerial and Insulators (3/6), and Marconi royalty paid. Usual price **£22 16 6**. **£14 10 0**

Undoubtedly one of the finest Sets on the market. Mounted in a beautifully finished cabinet with folding doors, it presents a handsome and attractive appearance. By a highly ingenious arrangement the power of a Four-valve Set is obtained though only three valves are actually used. This Set should give satisfactory Loud Speaker results in all parts of the country.

SET ONLY (with H.T. Battery and Marconi royalty paid)

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Please write clearly in plain Block Letters, and register Cash or Treasury Notes.
W.M.D. This coupon is not available after December 15th. E.P.S. 176

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.



Without an Earth Connection

Q.—I find that stronger signals are obtained from my set when the earth lead is disconnected, and as I have been unable to discover why I should be pleased if you could suggest a reason.—F. R. (Poplar).

A.—This may be due to employing a high-resistance earth, which may be checked and remedied by trying several earth connections at different points, but should this not be an improvement, then use a smaller tuning coil or try connecting the aerial-tuning condenser in series with the A.T.I.—L. A. C.

L.F. Amplifier Howling

Q.—I am using a crystal detector with a two-valve L.F. amplifier, but when I switch in the last valve howling commences. Can you suggest a cure?—P. A. R. (Cardiff).

A.—Connect the negative low-tension to the earth terminal of your crystal set, and if this does not stop the howl try reversing the connections to the secondary of one or both of the L.F. transformers.—K.

H.F. Valve Detecting

Q.—I possess a valve-crystal set (the valve acting as a high-frequency amplifier), and I find that when the contact is removed from the crystal there is no loss in signal strength; in fact, if anything, it is slightly clearer. Can you suggest what is wrong?—R. D. (Bury).

A.—This state of affairs is due to the valve acting as a rectifier instead of amplifying, and the best plan is to prevent the detecting action of the valve by inserting grid-bias between the earth end of the aerial-tuning coil and the negative L.T.

Make sure that the negative terminal of the grid battery joins the earth end of the tuning coil, and, in addition, try the effect of reversing the connections to the anode-tuning coil, especially if the latter is coupled to the aerial coil.

In some receivers of this type it often proves advantageous to reverse the connections to the crystal detector.—X.

Connecting Up the Lead-in Wire

Q.—When erecting an aerial, at what point should the lead-in be joined so as to ensure maximum efficiency? Is it advisable to install a single- or double-wire aerial?—J. T. (Cornwall).

A.—The position for the lead-in wire as regards where it joins the aerial depends upon the type of aerial it is intended to erect. If a T-type is intended the lead-down wire should be connected to the exact electrical centre of the overhead wire.

LET US HELP YOU

IN operating or constructing a set you may possibly meet with some difficulty that you cannot solve yourself. It may be something to do with bad reception or you may be in difficulty over some connection.

Whatever it is don't worry yourself; let the Technical Staff of THE WIRELESS MAGAZINE do all the worrying for you.

Replies to queries of general interest are published each month on this page, but every querist is answered direct by post.

Please observe the following rules:

Ask one question at a time; write on one side of the paper only; attach to your query the coupon on cover iii, and send it with a stamped addressed reply envelope to: The Editor, THE WIRELESS MAGAZINE, La Belle Sauvage, London, E.C.4.

For an inverted L aerial the lead-down wire should be connected to the extreme end of the horizontal wire, and for preference the aerial and lead-in should be retained in one piece.

On no account should the lead-down wire be connected a few feet from one end of the aerial, as such is very bad practice, and results in unbalanced tuning and poor signals.

As regards the number of wires, this is governed by the length of aerial available and the type of receiver it is intended to employ. A single wire is advised for use with a valve set, provided that the maximum length permitted by the regulations is obtainable; but should the length be restricted to about 50 or 60 feet then a double-wire aerial may be employed.

If the overhead portion of the aerial is limited to anything like 20 feet, then three wires may be found to be an advantage.

As a crystal set usually requires an aerial having a slightly larger capacity than does a valve set, one more wire added to these figures will be found satisfactory.—L. A. C.

Protecting D.E. Valve Filaments

Q.—As I have had a fairly expensive experience of burning out two D.E.-type valves, I should like your advice regarding the insertion of a fuse or some other safety device to prevent a repetition of this occurrence.—S. L. (Cardiff).

A.—There are several reliable and very effective safety devices now on the market to minimise such dangers, and provided they are fitted according to the makers' instructions very little fear for the safety of the valves need be felt.

These safety devices generally consist of a very high resistance connected in the positive or negative H.T. lead, which prevent the passage of a large current from the H.T. battery and so through the valves should an accidental short-circuit occur between the anode battery and the filament circuit of the set. You are advised to study the advertisement pages of this magazine.—L. A. C.

Accumulator Troubles

Q.—Quite recently I moved my L.T. accumulator to a cupboard on the opposite side of the room from my receiver. This was decided upon for appearance' sake, but I now find that my battery does not last nearly so long as previously after a full charge. Can you explain this, please?—T. W. (Bury).

A.—Your moving the L.T. battery has necessitated the use of long leads to the receiver. These cause an appreciable voltage drop between the battery and the set, and the voltage of the battery is insufficient to force the necessary current through to the valves in the set.

You are advised to shorten the leads as much as possible by placing the set near to the cupboard or putting the accumulators back near to the set as originally employed.—M.

Eliminating Distortion

Q.—I am troubled with a slight amount of distortion in my set. I use the best components in the way of L.F. transformers, and have adjusted H.T. and grid bias to suit. The distortion is only slight, but I should like to know how to eliminate it altogether.—F. A. (Worthing).

A.—If you have tried all of the usual methods of eliminating distortion without success, you might try the following:

Disconnect your present leads from the secondary of each L.F. transformer and rewire with fairly thin wire—No. 30 to 34 gauge is advised—when it will be found that the slight trace of distortion previously experienced will not be apparent.

This remedy generally proves satisfactory.—L. A. C.

COILS FOR THE VERY SHORT WAVES

Some Notes by 5 Y M

THE inductances that I find most useful for the really low waves are what are known as "basket weave." That is, they are wound on spokes arranged like the side supports of a basket, in contradistinction to ordinary "basket coils," which are wound like the bottom of a basket.

Numbers of Turns

I use coils of No. 18 d.c.c. wire, 3 inches in diameter. The most useful numbers of turns are 2, 3, 5, 7, 10, 12, 15. Occasionally I use a single loop of wire 3 inches in diameter in conjunction with one or other of the ordinary coils.

There is no sense in having low-loss coils in a high-loss mounting, and so these coils are mounted on strips of ebonite about 4 inches long. These strips are provided with valve legs spaced 3 inches apart and acting as plugs to engage in valve sockets which are mounted on a special three-coil holder made specially to take the coils.

Experiments with Any Circuit

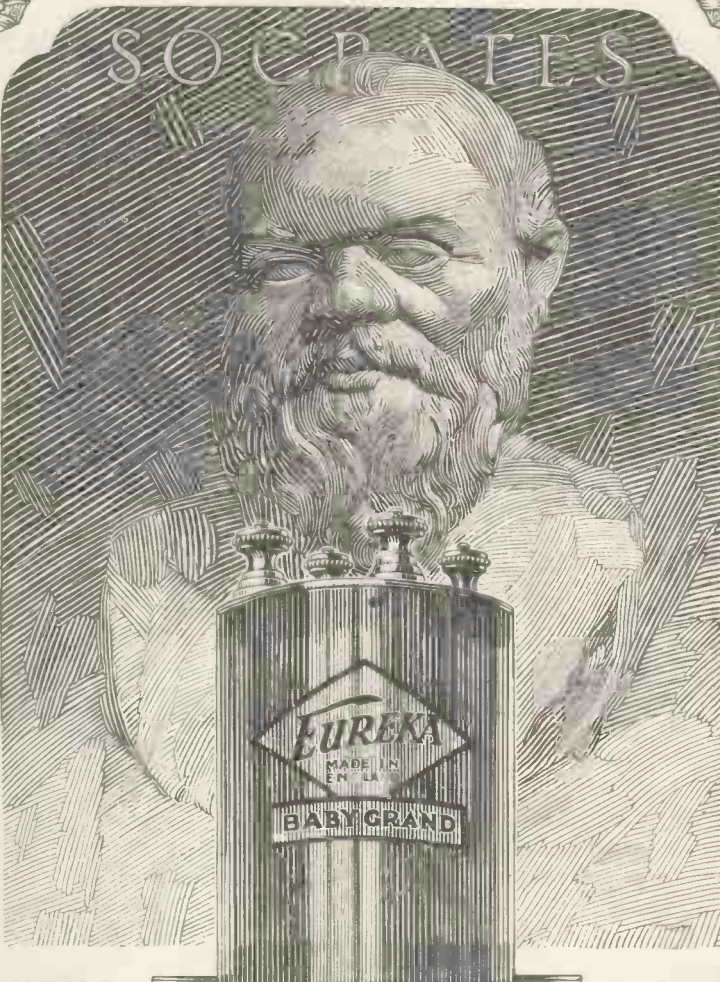
With such a set of coils and such a coil-holder it is possible to experiment with almost any circuit. Personally I favour the Reinartz. In this the first coil acts as the grid coil. Its end is connected to the beginning of the middle coil, and the junction goes to earth and the negative side of the filament. The other coil is the reaction coil as used in a typical Reinartz circuit.

Difficult H.F. Amplification

But there are some experimenters who favour the straight, untuned aerial and tuned secondary circuit. This is easily wired up, making the first coil the aerial and the middle one the secondary or grid coil. A stage of note magnification is useful with this circuit, but in my experience H.F. amplification, except on the "super het" principle, is very difficult to work below 150 metres and should not be attempted by any save experts.

5 Y M.

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.



Genius

"GENIUS," said the cynic, "is one part G^oinspiration and nine parts perspiration." In like manner the Eureka Concert Grand—based upon a laboratory ideal—was remodelled time and again until it could give the faithful mellowness of tone so greatly desired and hitherto unobtainable.

At one stroke the Eureka demonstrated an entirely new standard of tonal purity and volume—it proved that tenacity of purpose backed by sound electrical knowledge could solve a 3-year-old problem. And now the three new Eureka Transformers are again indicating the wonderful skill of their designers. For the first time the quality built into every Eureka Transformer is available at the phenomenally low figure of 15/-.

The same non-laminated core—the same coppered steel case—the same hermetical method of sealing—the same generous windings—and the same liberal guarantee. But now at a price within the reach of all.

Eureka Concert Grand . . . 25/-	No. 2 . . . 21/-
Baby Grand, Nos. 1 and 2 . . . 15/-	Reflex . . . 15/-

EUREKA

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REDUCTION!

COMBINE
VERNIER DIAL

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It will Pop!



One-hole fixing

The L. & P. Coil Holder besides having the smoothest movement of any on the market, has a one-hole fixing that **STAYS FIXED**.

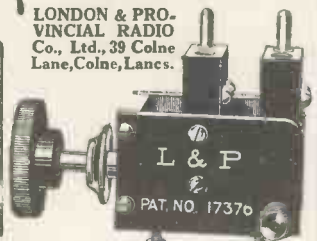
It operates through worm and pinion together with a compensating spring that makes backlash impossible. Hence the wonderful ease with which reaction can be controlled with this coil holder.

From all Good Dealers or write at once for list. Sent free on request.



L. & P.
Coil Holder
now

8/6



Other leading "Ellanpee" Lines.—L. & P. Valve Windows enhance the appearance of any set. Small size 2s. each. Large size 3s. each. L. & P. Miniature Switches, D.P.D.T., 1/6 each. L. & P. Pull & Push Switch, positive action, positive satisfaction, only 2/- each.

REFINEMENT  **IN RADIO**

Continental Notes

I FEEL that we should make a stand against the use of morse in connection with broadcasting stations. Surely, as it is, we are plagued with it sufficiently without it being deemed a necessity to further add to our discomfort.

My complaint is not levelled against any of our own home "broadcasters" who, in the relay of international programmes, on many occasions, have realised how much the dot and dash spoil our reception.

Morse Call Signs

You perhaps wonder what I am driving at? Simply this: Hamburg, Berlin and now Munster have all adopted morse call signs and tuning signals which are sent out, at frequent intervals, during the concert transmissions. What I fear is that the malady will spread. The ordinary broadcast listener does not want to learn the morse alphabet; leave that to the experimenter. Besides, not many of us could master the iddumpty language sufficiently to make it of use to us. It is true that we might memorise a few of the signs—but, all of them?

No, please leave morse out of it and stick to the spoken call. Give each station certain letters and, if necessary, a number, and induce the announcer to repeat, at frequent intervals, the name of the town in which the transmitter is located, and to state the wavelength utilised. In view of the constant changes made by some stations, I think the latter is most important. Don't you all agree with me?

How many times, when you have tuned-in a Spanish station, have you picked up dance music? It always seems my luck to do so, and I have come to the conclusion that the don and his señorita must tango through life.

Capture Radio-Iberica, Union-Radio, Cadiz, Barcelona, Catalana or San Sebastian when you will and deny my statement if you can. I have nothing to say against the music *qua* transmission, as the melodies are tuneful and the orchestras good; they lack neither energy, vim, nor "go."

But the trouble is that the wave-

lengths are chosen at random, irrespective of their possibility of interference with other European stations, the result being that unless one can catch the Spaniard whilst other broadcasters are resting, his transmissions are not always of unblemished purity.

Has it ever struck you how most broadcasting stations now devote the major portion of the evening entertainment to the celebration of some event or other? Continental stations always appear to be giving a concert in commemoration of the death of some well-known composer, or writer or poet or other big pot in one of the liberal professions.

They have not adopted a short "To-day's Anniversary" on the lines of the B.B.C. Calendar. They have gone one step further by devoting several hours to the occasion. Each programme has a distinct title; it may be a Schopenhauer or a Puccini night or the celebration of the coming of winter, or it may be devoted to a "stunt" whereby the microphone is made to travel far and wide.

We have heard broadcasts from the bottom of the sea, ditto from a mine, from the deck of a liner, from a Zoo, from a printing press, from an aeroplane, and, in fact, from almost everywhere.

Subjects

Notwithstanding this, we realise that the field of sounds has only been barely tapped. Should any of the stations find themselves at a loss for a subject, I offer the following suggestions:

The baby's first dip at Margate or Ostend or Paris-Plage, etc.

Collision between loaded Billingsgate fish-porters. (This should be powerful enough for a successful S.B. to all stations and could be made the subject of an international relay.)

The first morning's remnant sales at any big stores in any of the European capital cities.

P. P. E.'s jubilation (and remarks) when he definitely captures his first ether disturber.

That is enough to get on with, anyway.

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

To the uninitiated, the word "heterodyne" conveys but little meaning; "howl" is better, but the true thing is best described by *ululation*. The expression is singularly apt for, if you pick up two transmissions clashing with one another, the combined effect is similar to that lugubrious howl emitted by the stray mongrel on the doorstep in the stillness of a starry winter night! Yes, that howl with, perhaps, a Swiss yodel thrown in.

I wish I could claim proprietorship to that word *ululation*, but I cannot; I found it in a cross-word puzzle, looked it up in my dictionary and, as our Yankee cousins would say, "it jest tickled me to death. It was *it*."

I am wondering what the New Year will bring us; if all hopes were realised we should be, by the time these lines are in print, in full enjoyment of a clean ether. Are we? Partner, I leave it to you.

New stations, of higher power, are being erected, and are being planned. Their promoters believe that by such means our reception will be made much easier, especially of distant transmissions.

International Relations

Broadcast telephony will play an important part in international relations in the near future and, for that reason alone, every nation will desire a voice—and a loud one—in the matter.

The term "European concert," to-day, has lost its original meaning; to the wireless listener it signifies an interchange of ideas, of opinions, a dissemination of high-class music, a distribution of good things, all brought to him through the ether.

In a few years to come, we shall laugh at the thought of the little voice with its limited range; we shall just reach out, with our crystal set, for the *big noises* and, in the course of our evening's entertainment, we shall annihilate all distance.

On that day, broadcast telephony will come into its own; it will have achieved its purpose and have warranted its *raison d'être*.

Well, anyway, here's to a merry and happy wireless Christmas. May your ether search be aye crowned with success, your loud-speaker work on one valve, your accumulators always possess "juice" and your H.T. batteries be "just so" is the ardent wish of
JAY COOTE.

25/-



25/-

A careful experimenter's opinion

WE find that the best way to advertise the M-L Transformer is the easiest: we glance through our file of letters from people who have bought the transformers, and pick out one at random.

The one we have lighted on this time is from an experienced and painstaking English experimenter. He says:—

"After a large number of comparative tests with other makes, I have found the M-L Transformer to be entirely satisfactory. I find that it is absolutely silent in working, with practically no distortion, and that the amplification is quite high enough for all ordinary purposes. . . . There is no Transformer on the market that distorts less."

Wireless experimenters will find that their own experience will be the same as this.

If you cannot get the M-L L.F. Transformer from your Wireless Dealer, write and let us know.

The 1:6 ratio is used for amplification after a crystal rectifier.

The 1:4 ratio is used for single stage L-F amplification.

The 1:2.6 and 1:4 ratios are used respectively in the first and second stages of two-stage amplification.

S. SMITH & SONS (M.A.) LTD.
179-185, GREAT PORTLAND ST., LONDON, W.1

S. SMITH & SONS (M.A.) LTD

E.P.S. 8

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

How Not to Cause Interference

THE beginner is often at a loss to know how to avoid disturbing his neighbours with an oscillating valve, and either renounces his reaction coil altogether or else causes severe heartburnings amongst his fellow citizens with his continuous condenser sweepings, until the wrath of the powers that be falls upon his devoted head and his licence is no more.

Strictly speaking, reaction should not be used direct on the aerial during broadcast hours and on broadcast wavelengths, but since the amateur is always subject to temptations and often presents a weak defence when so tempted, and also that to err is human, a few tips on "how to do it" would perhaps not be out of place.

In the first place, when tuning-in a distant station by the aid of a reaction coil with a "straight" circuit, remember that varying the coupling also varies the tuning, and manipulate both the reaction coil and the tuning condenser slowly and at the same time, but do not oscillate the condenser back and forth, as it is

DO YOU WANT TO BUY A SET?

We shall be glad to advise you as to which types of sets are the best for your personal use.

Tell us how much, roughly, you wish to spend; where you are situated; what stations you wish to receive; whether you intend to use phones or a loud-speaker, and we will advise you as to the general lines of sets that will answer your purpose.

Send your enquiry with coupon (p. iii cover) and stamped addressed envelope to—

"Buyer's Advice" Bureau."

THE WIRELESS MAGAZINE.

La Belle Sauvage, E.C.4.

this that causes most of the annoyance.

Secondly, if it becomes apparent that you must heterodyne the carrier wave of the wanted station before you can tune it in, refrain from so doing, but switch in an H.F. amplifier, taking care that the aerial and reaction coils are wide apart before so doing.

Thirdly, if you are using a straight amplifier with a potentiometer to kill oscillation, make sure that it is right over on the positive side before commencing to tune, otherwise the oscillations of this valve may be worse than your "controlled" reaction.

If amateurs would observe these simple rules there would be much less complaint against regenerative sets and all listeners would be benefited thereby.

Finally, it is the man who is always on the fidget with his condensers that is the greatest nuisance to the programmes from the local stations.

A. J. C.

The Weekly that solves your Wireless Problems

Amateur Wireless

3^D
Every
Thursday

Take "Amateur Wireless" Each Week
and Get the Best Results from Your Set

Cassell's, Publishers, London

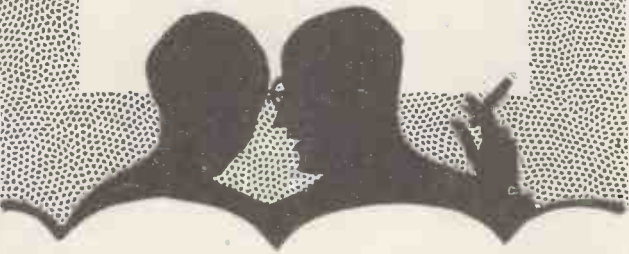
Exclusively devoted to the interests of Wireless Amateurs and essentially a practical paper. It is lavishly illustrated with photo reproductions and many explanatory drawings and diagrams. A great feature is Expert Replies to Readers' Questions. Other regular features, all fully illustrated, are — On Your Wavelength! (Chatty paragraphs by "Thermion"), Components You Can Rely Upon, Around the Showrooms, Progress and Invention, Latest News in Brief, Times and Wavelengths of Home and Foreign Stations, etc. etc.



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"SUNDAY CHRONICLE" COLOUR BALLOT

CASH **£25,000** PRIZES
FIRST PRIZE
£10,000



"Let's have Two!"

Jim: "FIRST PRIZE £10,000! My hat! Fancy waking up and finding that one had won that!"

Cynthia: "You could buy a partnership, couldn't you, and set up in business?"

Jim: "And, incidentally, set up housekeeping, what?"

Cynthia: "M'm—but are you sure that you'll really get paid if you win?"

Jim: "Sure as you're born. The £25,000 prize money is guaranteed by the *Sunday Chronicle*, and the whole competition is run by the British Charities Association. That makes two things absolutely certain—the money's there all right; and if you win, you get it!"

1st Prize £10,000, and over 1,114 prizes, all guaranteed by the "Sunday Chronicle."

COLOUR BALLOT

Organised by the British Charities Association

PRESIDENT: THE VISCOUNT KNUTSFORD.

TO HELP THE HOSPITALS.

TICKETS 5/- HALF-TICKETS 2/6

(A Half-Ticket may win Half-a-Prize)

Get Tickets from Newsagents, Booksellers, or POST THIS COUPON

TO THE BRITISH CHARITIES ASSOCIATION,
Kingsway House, Kingsway, London, W.C.2.

I enclose £ : : and stamped addressed envelope.

Please send me Colour Ballot {whole tickets
.....half-tickets

Name in full.....
(Mr., Mrs. or Miss) W.M.,B.2.

Address.....

Cheques and Postal Orders should be made payable to the British Charities Association and crossed "& Co."

Cynthia: "And what do you have to do, exactly?"

Jim: "Oh, vote which you think are the most popular colours, I believe. It sounds easy. Tickets 5/- each."

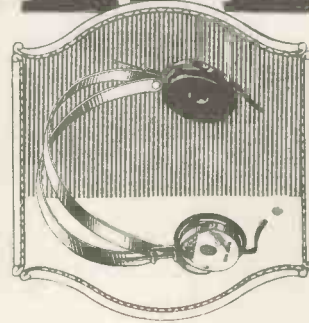
Cynthia: "Is that all? And £10,000! Why, it would be perfectly silly not to have a shot! Where can we get a ticket?"

Jim: "On the way out. There's a shop showing the Colour Ballot poster just across the road. I'll get one there!"

Cynthia: "No—we'll have two!"

Jim: "That's the way—double our chances and halve our difficulties. Now then, let's start getting ideas. Which colour do you like best?"

EFESCA



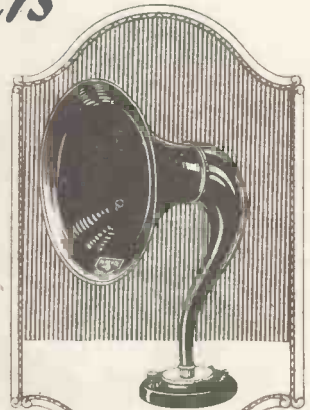
headphones

GOOD HEADPHONES ensure the greatest pleasure from your set. Efesca headphones are light and easy to wear, exceptionally clear and evenly matched in tone, and provide faithful reproduction with full volume of sound.

The magnets are of cobalt steel, ground perfectly true, diaphragms of stalloy, and headbands of polished duralumin. 4,000 ohms, with 6 feet of flexible cord, 18 - per pair.

PURAVOX loud speakers

For power and purity of reproduction the Efesca Puravox Loud Speaker stands supreme. It is so constructed that the relation of the magnets to the diaphragm is capable of very fine adjustment, allowing the utmost volume of sound to be obtained. The horn is acoustically perfect, and the whole instrument is most handsomely finished with a crystalline surface. Puravox Standard Model 80/-, Junior 48/-, Miniature 25/-.



EfescaPHONE RECEIVING SETS



There are EfescaPHONE Receiving Sets at prices ranging from the simple crystal set at £2 5 0 complete with aerial outfit and headphones, to the 4-valve EfescaPHONE with cabinet incorporating Puravox Loud Speaker at £59.

Sold by all Wireless Dealers. Write for new catalogue No. 559/11, describing EfescaPHONE Sets and Efesca Components.

Wholesale only:—

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Efesca Electrical Works,
83-93, Farringdon Road,
LONDON, E.C.1,
and at Glasgow, Manchester and Birmingham.



We earned £3 in spare time last week—and we want to beat that this—so when Dad has had his tea we're going to get busy!

The work's awfully interesting, and it only cost us a few shillings for tools and Two Guineas for the Patent Licence.

The Company buys our output at a good profit when we have any over from local orders—but with Wireless and one thing and another we have more work than we can do!

If you would like to "get busy" too, write for full particulars—which will be sent you entirely without obligation and in plain wrapper—enclosing 1½d. stamp, to:

The England-Richards Co.,
5D, King's Lynn, Norfolk.



It really is the best and most enduring gift Old Man Santa could leave at your house this Yule—a dividend earning present that will never be forgotten.

CABINETS AND BOXES

for WIRELESS (Guaranteed)

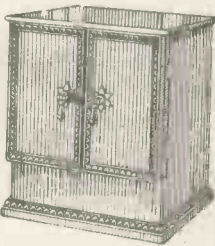
The Price of this Cabinet—

MAHOGANY
To take Panel 14x9 in. 39/6
" " 12x9 in. 36/6
" " FIGURED OAK
To take Panel 14x9 in. 36/6
" " 12x9 in. 33/6

BOXES—Fitted with Lid
Support Lid, 2-in. deep.
Bottom, 5-in. deep

3-in. MAHOGANY
12 x 9 in. Panel ... 18/6
3-in. FIGURED OAK
12 x 9 in. Panel ... 15/6

Cabinets and Boxes Made to Order.



Model E. Type No. 3.
SEND FOR CATALOGUE

G. A. HANCHARD,

26, Page Street, Westminster, S.W.1.

Catalogues and Pamphlets

THE new Cosmos crystal set, specially designed for Daventry, is fully described in a booklet obtainable from Metro-Vick Supplies, Ltd., 4, Central Buildings, Westminster, London, S.W.1.

Lotus vernier coil-holders are fully described in a booklet issued by Garnett, Whiteley & Co., Ltd., Lotus Works, Broadgreen Road, Liverpool.

A new leaflet, obtainable from The Athol Engineering Co., Cornet Street, Higher Broughton, Manchester, deals with the Athol reversible valve-holder.

The Igranic combined filament rheostat and grid leak is described in a leaflet issued by Igranic Electric Co., Ltd., 147, Queen Victoria Street, London.

"Wireless Components and Accessories" is the title of a new publication obtainable from Enterprise Mfg. Co., Ltd., Grape Street, Shaftesbury Avenue, London.

The British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, have issued pamphlets dealing with all their products.

Particulars of the new A.J.S. two-valve set are contained in a list issued by A. J. Stevens & Co. (1914), Ltd., Walsall Street, Wolverhampton.

A booklet describing wireless crystals will be sent on application to Leslie G. Russell, 1 to 5, Hill Street, Birmingham.

Dubilier valve-protector units and Dubilier-Mansbridge variometers are described in leaflets issued by The Dubilier Condenser Co. (1925), Ltd., Ducon Works, Victoria Road, North Acton, London, W.3.

"Splendour in Sound" is the title of a brochure describing the Marconiphone super loud-speakers, obtainable from The Marconiphone Co., Ltd., Marconi House, Strand, London, W.C.2.

S. Guiterman & Co., Ltd., 35 and 36, Aldermanbury, London, E.C.2, will send their list of components on request.

A leaflet describing new types of filament rheostats will be sent to readers making application to Igranic Electric Co., Ltd., 147, Queen Victoria Street, London.

The Watmel new type of fixed condenser is fully described in a leaflet issued by Watmel Wireless Co., Ltd., 332a, Goswell Road, London, E.C.1.

"Wireless Components and Accessories" is the title of a booklet obtainable from The General Electrical Co., Ltd., Magnet House, Kingsway, London, W.C.2.

A. J. Stevens & Co. (1914), Ltd., Walsall Street, Wolverhampton, have recently issued a booklet describing their choke-amplifying units.

Pending the issue of their complete catalogue a leaflet describing wireless goods may be had from Grafton Electric Co., 54, Grafton Street, Tottenham Court Road, London, W.1.

An abridged catalogue of Efesca components can be had from Falk, Stadelmann & Co., Ltd., 83-87, Farringdon Road, London, E.C.1.

Cleartron Radio, Ltd., 1, Charing Cross Road, London, will send particulars of the Cleartron valves on application.

"The Name Behind a Product" is the title of a booklet issued by The Dubilier Condenser Co. (1925), Ltd., Ducon Works, Victoria Road, North Acton, London, W.3.

A handy little booklet, entitled "Wireless Receiving Sets," can be had from The General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2.

Siemens Bros. & Co., Ltd., Woolwich, London, S.E.18, have issued a new booklet dealing with their products.

Airmax bare-wire tuning coils are described in a leaflet obtainable from J. Dyson, 5-7, Godwin Street, Bradford.

Cables and wireless valves are the subjects of a circular issued by Luminax Ltd., 553, Mansion House Chambers, Queen Victoria Street, London, E.C.4.

A leaflet describing "Super het" components may be had from L. McMichael, Ltd., Hastings House, Norfolk Street, Strand, London, W.C.2.

All readers should write for these catalogues, which will be sent gratis and post free if THE WIRELESS MAGAZINE is mentioned.

The latest catalogue of the Goswell Engineering Co., Ltd., 95-98, White Lion Street, London, N.1, is now ready and will be sent on request.

Supreme condensers, the product of Shenton & Co., Ltd., 68-69, Shoe Lane, London, E.C.4, are described in a leaflet issued by that firm.

Columbia dry batteries are fully described in a folder and booklet issued by J. R. Morris, Imperial House, 15-19, Kingsway, London, W.C.2.

Sonora loud-speakers are the subject of a folder issued by The Electrical Co., Ltd., 109-111, New Oxford Street, London, W.C.1.

A catalogue describing the Telwave wireless components may be had from The Electrical Equipment & Carbon Co., Ltd., 109-111, New Oxford Street, London, W.C.1.

A leaflet giving full details of Condit, the H.F. conductor, may be had from Autoveyors, Ltd., 82-84, Victoria Street, London, S.W.1.

A copy of a catalogue dealing with Renown products will be sent on application to Transformer Repair Co., Hay Street, Plymouth.

The new catalogue issued by The Lumos Radio Valve Co., Ltd., 64, Mill Hill Road, Acton, W.3, fully describes Lumos valves.

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

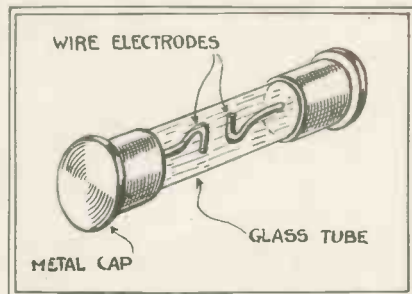
TESTING THE POLARITY

How to Make a Simple Pocket Polarity Tester

A VERY useful little polarity tester can be made from a piece of glass tubing and some odd pieces of material found on a scrap heap.

Usual Method

Should there be any doubt as to which is the positive or negative lead of a battery the usual method is to place both leads in a glass of water to which common salt has been added,



Completed Polarity Tester.

when small white bubbles will collect round the negative.

A handy little pocket instrument can be made as follows: A piece of glass tubing about $\frac{1}{2}$ in. in diameter and about 4 ins. long is required which can be obtained from a chemist. Two short lengths of No. 16- or 18-gauge copper wire are bent as shown in the illustration and pushed through two small corks which should fit the tube tightly. There should be a space of about $\frac{1}{8}$ in. between the hooked portions of the wires.

Filling the Tube

One of the corks is placed in position and the tube is then filled with a solution of salt or sal ammoniac in water. The other cork is gently pushed in and a little sealing-wax is run over the ends of the corks and edges of the tube. Two metal caps, built up from two 1-in. lengths of thin brass tubing and two discs with holes drilled in them, are now slipped over the ends of the glass tube. The projecting pieces of wire are cut off and the ends neatly soldered in the holes in the ends of the caps. R.S.H.

"No! I can't afford anything more than a Crystal Set."

"NO, I can't afford anything more than a Crystal Set," said Jack Miller the other evening. We had been discussing Wireless and I had suggested to him that with the long evenings coming on he ought for his family's sake to get a Set that everyone could enjoy. "It's no use my thinking of laying out £20 to £25 on a Set this year. Besides everyone tells me that it costs such a lot to run them." "That's not true," I protested. "My four-valve Set runs practically a month without my having to get the Accumulator recharged." "Yes," he admitted

with a laugh. "But then you always were a careful sort of cuss. Anyway I've still got a Doctor's bill to pay so it's no use thinking about it." "But it is not necessary these days to spend twenty pounds on a Wireless Set," I rejoined, "why not make one for half the price and save the rest?" "It would be a rummy sort of Set by the time I'd finished with it," said Jack with a chuckle, "why, I've never made one in my life. Besides, I've no time to learn." "Now, look here," I said, "would you spend six pounds to get a Set as good as mine?" "Of course, but . . ." "There's no 'but' in this," I cut in; "would you give up three evenings next week?" "Yes," he

replied wonderingly. "Then you shall have a Set just like mine." I could see that he did not understand what I had been driving at.

"Do you mean that you built that splendid 4-valve Set of your's?" he asked with amazement. "I did—every bit of it except the cabinet," I replied. "Good heavens, I thought it was a bought Set!

You do surprise me. Somebody must have helped you, though?" he suggested. "No, I did it all by myself, and it took me exactly three evenings—in fact, on the night it was finished there was still time for Janet and I to have a dance to the strains of the Savoy Band to celebrate the occasion."

And then I let him into the secret, and told him all about the Pilot idea. I showed him a copy of the Pilot Manual I happened to have in my pocket, and explained how easily any of the Sets could be assembled. "Do you mean," he asked, "that even an old duffer like myself could build up a 4-Valve Family Set?" "I'm sure," I replied, "there is nothing to do except mount the parts on the panel and solder up the connections. And they supply you with fine big blue prints to make sure you don't make wrong connections." "Well, I'm bothered," he answered, "that's a pretty brainy scheme. I'm hanged if I don't have a shot at it. How much did you say your's cost? I showed him. "Here it is on page 23, the complete price is £6 8s. 3d.—and if you like to make your own cabinet that will save you 17/-." "No," he decided, "I'm no carpenter, I'll buy the whole bag o' tricks and send them a cheque right away——"

And a fortnight later when I called, the whimsical voice of John Henry was amusing the whole household, so I knew that Jack Miller was now a fully fledged home constructor.



PETO-SCOTT CO. LTD.
77 CITY ROAD, E.C.1

BRANCHES: 62 High Holborn, London, W.C.1.
Walthamstow: 230 Wood Street.
Plymouth: 4 Bank of England Place
Liverpool: 4 Manchester Street.

Pilot Sets

for home Constructors

Please send me a copy of the Pilot Manual, giving detailed working instructions and illustrations for building many of the well known Radio Press Sets. I enclose 3d. to cover cost of postage, etc.

Name

Address

P.S. 3921

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

What the B.B.C. Is Doing (Continued from page 524)

advertising should support broadcasting. A broadcasting organisation seeks an audience, just as a newspaper seeks circulation, and in order to get that audience, something good must be supplied; and the logical way in which to pay for that something is by advertising. The newspaper pays its way in great part by the advertising which it secures. As the newspaper sells space, so the broadcasting service should sell time.

Commercial Enterprise

This is to regard the question of broadcasting as a purely commercial enterprise, utterly devoid of any such ideal as service, which is one of the characteristics of friendship. Fortunately, the British listener is not plagued with the distasteful programmes of direct advertising and solicitation which any frenzied fanatic seems able to have transmitted by some of the American stations.

The regulations governing the agency by which speech, music, play, or ceremony are brought to the Briton's home, free him from the

necessity of regarding the items, as it were, suspiciously, and in fear lest the transmission of the works of a musical genius is merely an instrument enshrouding some subtle call to the bargain counter or the quack's parlour.

Broadcasting must, obviously, be paid for by someone; but it will not be paid for by the advertising agent. Public taste in this country would oppose any attempt to use the medium of broadcast for advertising purposes, and we would never be a party to such an attempt.

Now that the winter session of talks and lectures is in full swing listeners are in a position themselves to judge the effect of the efforts made to introduce "balance" into this part of the broadcast programmes.

We may summarise the steps which have been taken in the following way:—

1.—A rearrangement of the time-table has enabled us to give a clear run of entertainment during

the principal listening hours, namely, 8 p.m. to 10 p.m. The 10.10 p.m. talk, which is the "feature" talk, no longer intrudes upon an entertainment programme, being separated from it by the second general news bulletin; while the other talks take place in what is called the "magazine hour"—7.0 p.m. to 8.0 p.m.

This is not, perhaps, from the point of view of some listeners an ideal arrangement, inasmuch as 7.10 p.m. is an inconvenient time for those sections of the population who may be supposed to combine high-thinking with late dining; but it may be remarked that whereas any inconvenience that exists may apply to thousands, the hour is immaterial to hundreds of thousands who take their chief meal in the daytime.

However, the winter programme is designed to obviate this by sometimes putting talks of the best intellectual quality at 7.40 p.m.

2.—By emphasising among those

(Continued on page 544)



The Secret in the Base

THE tone of a "Sparta" has a difference that you can appreciate at first hearing. It is full, clear, convincing.

You can control it. The six stops of the tone modulator cover the whole range of vocal and instrumental reproduction. The new patent Magnetic Compensator gives a remarkably distinct rendering. The secret is in the base . . . there is no other speaker like it.

SPARTA
Fuller
ALL BRITISH

LOUD SPEAKER
ELECTRIC WORKS, LTD.
ESSEX

The Type B. "Sparta" is supplied with diaphragm adjustment and tone controller for six positions.

120 ohms ... £5 15 0
2,000 ohms ... £6 0 0
4,000 ohms ... £6 0 0

The Type A Model, without tone controller, supplied for 120, 2,000 or 4,000 ohms. £4 15 0.

The "Little Sparta" is supplied in the same three ohmages for ... £2 10 0

FULLER'S UNITED
CHADWELL HEATH
Telephone: Ilford 1200.

Telegrams: "Fuller, Chadwell Heath."

London Depot:
176 Tottenham Court Road, W.1.
Telephone: Museum 9008.

174/49.

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

Your radio set
can be improved
by using

B.T.H. VALVES

MADE IN ENGLAND

*Ask your dealer-
he knows that
B.T.H. Valves, Sets,
Loud Speakers,
Headphones &
Components
are the best.*

**Insist on
B.T.H. the
Best of All**



*The British Thomson-Houston Co. Ltd
Crown House, Aldwych, London, W.C.2*

SIX TYPES

R 0.7 A.	B3 0.35 A.	B5 0.06 A.	B4 0.25 A.	B6 0.12 A.	B7 0.06 A.
4 v. 8/-	1.8 v. 14/-	2.8 v. 16/6	6 v. 22/6	2.8 v. 22/6	6 v. 24/6

2442

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

What the B.B.C. Is Doing (Continued from page 542)

organisations who have to provide talks of a propagandist or public character the absolute necessity of making these talks attractive in form and style.

3.—By providing a sufficiency of really popular talks in order to counterbalance the effect of the heavier type.

Most Popular Talks

The most popular talks are probably those which are of a topical nature; but when we are asked by a critic why a talk on a certain amateur championship was not given by the amateur champion on the night of his victory, it is clear that the programme time-table is assumed to be flexible and open to sudden incursions, whereas the programme organisers are compelled to draw up their programmes a month or six weeks in advance.

It also indicates an assumption that winners of amateur championships are agreeable to come to the studio and talk genially at a moment's notice. This is not the case invariably.

During the last two or three months we have acceded as far as possible to the demand made by some critics for topical talks, and provision is now made for the occasional introduction of a person of strong topical interest at very short notice. In pursuance of this policy the B.B.C. has been able to bring before the microphone many well-known personalities.

* * *

The task of station directors is one calling for constant vigil and alertness. Generally, five weeks before the date of a performance the directors prepare their local programmes and the details are sent to headquarters a month in advance of the performance. When the arrangements are completed some unforeseen event occurs which prevents strict adherence to the scheduled arrangements; or London offers an important item for simultaneous broadcasting, which the provincial director feels will be more acceptable to listeners in his territory than the items fixed up locally.

The search for new talent is another harassing problem. Then the station director may be called upon not only to assist in the preparation of the chief items of the evening's broadcast, but himself to appear before the microphone, either as a character in a play, or to assume all the characters which are to be portrayed. There are, in fact, a thousand and one duties, including those pertaining to the administration of the local service, to be performed in the working day, which often extends over twelve hours.

Exchanging Ideas

In addition to his work on the spot the station director sometimes spends short periods in the territory of a colleague, not only to widen his ideas and experience, but to consolidate matters of policy and to secure unity of outlook and control. This idea is being expanded, and station directors are to be brought in closer contact with broadcasting arrangements in general by paying regular visits to headquarters.

If Valves could only Speak
 THEY WOULD DEMAND
GECOPHONE
 Super Capacity High Tension
RADIO BATTERIES
 because these new batteries, by virtue of their
**LARGE CAPACITY,
 SILENCE IN USE,
 MINIMUM INTERNAL
 RESISTANCE,
 and LONG LIFE**
 make such an immense improvement in radio reception.



These Batteries are the latest development in BRITISH battery manufacture and their merits are so outstanding that they are rapidly becoming the Standard H.T. Batteries for Radio Work.

GECOPHONE

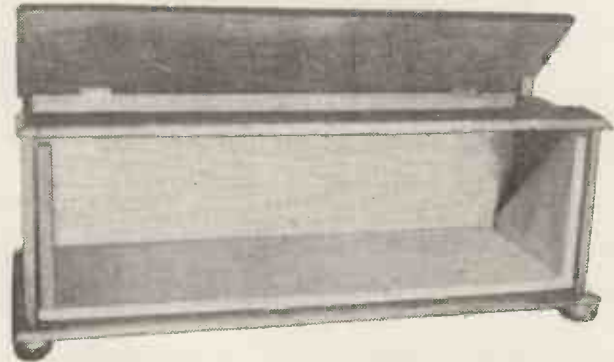
Super Capacity High Tension RADIO BATTERIES.
 Sold by Wireless and Electrical Dealers everywhere.

Prices from 7/6 to 27/6

Manufacturers: The General Electric Co., Ltd., Magnet House, Kingsway, W.C.

CAXTON 4-VALVE CABINET

Made for Editor of Wireless Magazine for Set "As good as money can buy" described in issue February, 1925.



Cash with Order. Fumed Oak ... £1 5 0

or Real Mahogany polished ... £1 14 0

With detachable recess fitted Base Board to mount 21 in. by 7 in. panel to slide out of Cabinet front.

Extra 10/- with two beaded front doors totally enclosing fitted panel

Cabinet overall length 22½ ins. Width 8½ ins. Height 9 ins.

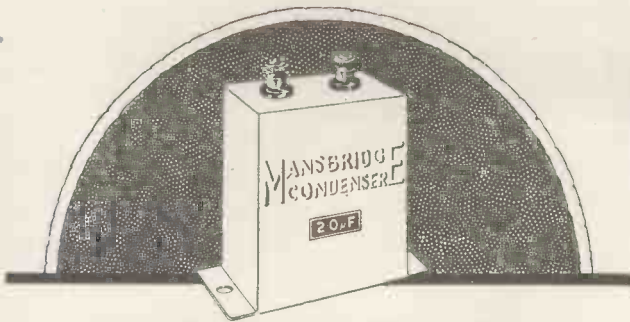
Polished with the new enamel that gives a glass hard surface that cannot be soiled or scratched.

SENT FREE.—Catalogue of standard Wireless Cabinets in various sizes and woods. Special Cabinets made to customer's orders.

PACKED AND DELIVERED FREE IN U.K.

CAXTON WOOD TURNERY CO., Market Harborough

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.



THE Mansbridge Condenser

WE have pleasure in announcing that the genuine Mansbridge Condenser, originated and designed by Mr. G. F. Mansbridge, over 20 years ago, will now be manufactured by the Mansbridge Condenser Co., Ltd., under the aegis of Mr. G. F. Mansbridge, himself, and marketed with the full backing of the Dubilier Condenser Co. (1925), Ltd.

No Condenser of the "Mansbridge" Type is a genuine product of the Mansbridge Condenser Co. unless the words "Mansbridge Condenser" are plainly embossed on the metal case. The colour of the case is maroon.

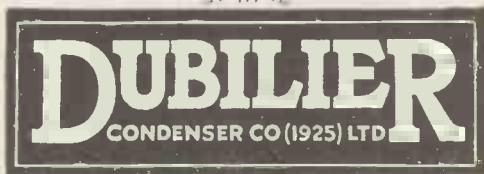
The capacity is plainly marked and is accurate to within fine limits, and nickel-plated screw terminals are provided for making connections.

In your own interests you should see that when you require condensers of this type you

Specify Mansbridge.

Prices and Capacities

Capacity	Prices
0.05 mfd	2/6
0.10 "	2/6
0.20 "	2/8
0.25 "	3/-
0.30 "	3/-
0.40 "	3/3
0.50 "	3/6
1.00 "	4/-
2.00 "	5/-



ADVT. OF THE DUBILIER CONDENSER CO. (1925), LTD.,
 DUCON WORKS, VICTORIA RD., NORTH ACTON, LONDON, W.3.
 'Phone: Chiswick 2241-2-3.

E.P.S. 2.

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.



He never gets
 let down now!

A Feeling of Complete Confidence

He knows how to avoid those disappointing evenings when he had to announce to his friends, in the middle of an enjoyable programme, "Sorry, the battery has run out."

He remembers, too, how that meant missing the following evening's programme as well, because he wasn't able to get his batteries charged in time.

To-day, it's all changed. A month with PHILIPS RECTIFIER has given him a feeling of complete confidence that he will never be let down now, and that there is one battery charger that always gives complete satisfaction.

Philips Rectifier works off A.C. supply, requires no supervision, works silently, and automatically regulates the current supply.

There are no objectionable chemicals, no buzzing noises, and you have, in fact, a most reliable battery feeder with an extraordinarily low running cost.

SIMPLE—CONVENIENT—EFFICIENT

It charges while you sleep.

Write for leaflet W.M., free on application.



Trade Enquiries Invited.
 COMPLETE.

PHILIPS RECTIFIER

Advt. Philips Lamps Ltd., 60 Wilson Street, London, E.C.2

REMOTE CONTROL FOR YOUR SET

Details of a Simple Distant-control Switching System

IN many homes it is the practice to place the loud-speaker in a different room from that in which the set is installed; and in such cases it is a great convenience to fit a remote-control device so that the set can be switched on and off from the point where the loud-speaker happens to be.

Extended filament leads are, in most cases, out of the question, for the resistance is high enough to seriously limit the amount of current passed through the circuit.

The writer has successfully employed a dynamo cut-out, as used on a car, for this purpose. In fact, a Ford cut-out was bought for 4s. 6d. and wired as follows (see diagram):

(1) A wire was taken from the battery to the primary connection of the cut-out.

(2) A wire was taken from the secondary connection of the cut-out to the receiver.

(3) A wire was taken from the other terminal of the receiver to the other terminal of the battery.

(4) A wire was taken from the battery terminal (same pole as wire 3) to the switch in the living-

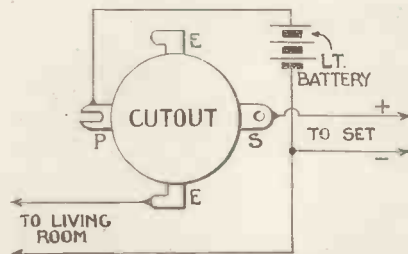


Diagram of Connections to Cut-out for Remote Control.

room and back from there to the earth connection of the cut-out.

On closing the switch the primary circuit is also closed, thus magnetising the core of the primary coil, which draws down a lever and allows

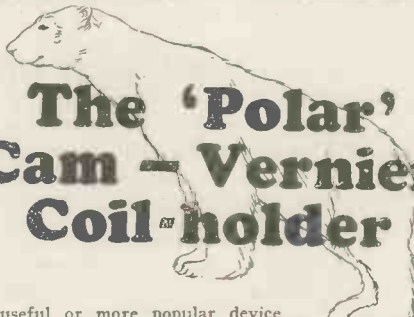
current to flow from P to S, then to the receiving set and back to the battery.

It will be seen that only the primary current has to flow into the living-room, the main flow being by-passed. As the current required by the primary is very small, the resistance of the bell-wire is negligible. Care must be taken that the bell-wire extension is inserted in wire (4) and not wire (1) as, although the arrangement will work in the latter case, the main current will have to flow through the bell wire.

After buying the cut-out it may be necessary to remove the cover and ease the spring, as it is adjusted to work on a slightly higher voltage than six for car use.

When the switch is opened the primary current ceases to flow, the core becomes demagnetised, a spring draws back the lever, and so the main current flow is broken. T. M. L.

The 'Polar' Cam - Vernier Coil-holder



No more useful or more popular device has been introduced for the simplification of fine tuning than the "Polar," the original Cam-Vernier Coil-Holder. Permits 10 degrees of vernier control at any portion of the movement, in either direction. Adjustable tension. Best ebony, nickel-plated fittings; locking device for positive drive.

This illustrates the Polar Junior Cam-Vernier Coil-Holder. Two-Way pattern obtainable for either right- or left-hand drive.

2-WAY
6/-



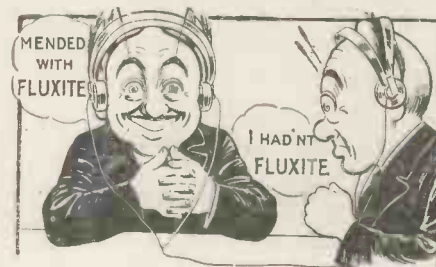
3-WAY
9/6

Sold by all reputable Radio Dealers. In case you have difficulty in obtaining, write to:

RADIO COMMUNICATION CO., LTD.
34-35, Norfolk Street, Strand, London, W.C.2

HAS NO GEARS

WISDOM AND WIRELESS



The wise wireless enthusiast always keeps a tin of FLUXITE close at hand. The set may be perfectly made, but that does not protect it from accidental jars and jolts which upset its

delicate adjustment. With FLUXITE in the house these little things are easily put right.

Ask your Ironmonger or Hardware Dealer to show you the neat little

FLUXITE SOLDERING SET

It is perfectly simple to use, and will last for years in constant use. It contains a special "small-space" Soldering Iron with non-heating metal handle, a Pocket Blow-lamp, FLUXITE, solder, etc., and full instructions. Price 7/6. Write to us should you be unable to obtain it.

Price 7/6



FLUXITE SIMPLIFIES SOLDERING

All Hardware and Ironmongery Stores sell FLUXITE in tins, price 8d., 1/4, and 2/8.

Buy a Tin To-day.
FLUXITE LTD. (Dept. 332), West Lane Works, Rotherhithe, S. E. 16

ANOTHER USE FOR FLUXITE. Hardening Tools & Case Hardening. ASK FOR LEAFLET on improved methods

In writing to advertisers, please say you saw the advertisement in THE WIRELESS MAGAZINE.

THE PANEL

DE LUXE



If after you have built up your Set you find that a component is unsatisfactory it can usually be replaced without much difficulty. On the other hand a leaky panel will render useless the work of many hours and necessitate the complete rebuilding of the Set. Be wise, therefore, and refuse to take risks. Don't ask merely for an ebonite Panel—ask for a Radion Panel and see that it bears the trade mark Radion.

Radion is available in 22 different sizes in black and mahogany. Radion can also be supplied in any special size. Black 1d. per square inch, mahogany 1½d. per square inch.

RADION

American Hard Rubber Company (Britain) Ltd

Head Office: 13a Fore Street, London, E.C.2
 Depots: 120 Wellington Street, Glasgow; 116 Snow Hill, Birmingham; Irish Agents: 8 Corporation Street, Belfast

Gilbert Ad. 3723

The FAMOUS GENERAL RADIOPHONES

YOURS for 6^d DEPOSIT

Latest Standard Model General Radiophones (made by the well-known General Radio Company, Ltd.), super-sensitive and highly efficient. Receivers matched in tone. Magnets of highly expensive Cobalt Steel. Diaphragms triple tested. Accurately designed sound chamber gives natural tone. Beautifully comfortable, highly finished, weight 7 ounces. Fully guaranteed. Sent on receipt of 6d. deposit. If satisfied, you send 26 more on receipt, balance 2s. monthly until only 21s. is paid. Price full cash with order or within 7 days, 21s.

IMPSON'S (Brighton, Ltd.) (1636), 94, Queen's Rd., Brighton.

**EVERY HOME A WIRELESS SET
 EVERY WIRELESS SET A HOME**

This is the Cabinet you have been looking for.

The "MORRIS" Standard Wireless Cabinet accommodates any kind of receiver and panel up to 36 ins. x 18 ins., with all accessories.

Solid oak throughout and perfect workmanship guaranteed. (Smaller size 56 lbs. net.) No plywood used. Sent on approval against remittance.

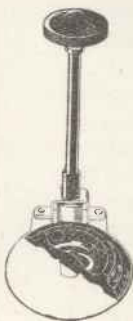
Model "A" 22" inside as illustrated. £4/15/0
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 " "C" 25 " " " Jacobean panels 25/15/0

We have also a cabinet in Pine wood, oak stained, 30" wide inside, at 22/5/0. Carriage paid and packed free England and Wales.

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FAMOUS GENUINE EBONITE PANELS

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Notings on the Month's Progress

Stereophonic Broadcasting

THE flat appearance of an object when viewed with one eye only, as compared with the fuller perspective or depth secured when both eyes are used, illustrates the well-known stereoscopic effect in optics. A similar flattening occurs when sounds are heard as though with one ear only, an effect which is typical of ordinary broadcast reception.

There is practically no depth or background, and a listener cannot, for instance, tell as between two voices which is to the right and which is to the left of the microphone, or in which direction an actor may be moving as he speaks.

In order to remove this drawback, the suggestion has been made to utilise a method of binaural or stereophonic transmission, in which two separated microphones are employed for the purpose of introducing a phase difference in the transmitted sounds.

At the distant end the two trans-

missions are fed separately into the two earpieces of a telephone receiver and are naturally amalgamated into a combined "plastic" reproduction, in much the same way as two photos are superposed in the ordinary stereoscope.

A simpler way of producing the same effect at the receiving end, using only a single microphone for transmission, has been suggested by a German inventor named Kluth.

To do this he introduces sufficient phase difference to give the required tonal "depth" in the rectified telephone currents, by means of a special transformer and variometer coupling inserted between the two separate earpieces of the receiving phones.

* * *

Too Many Wireless Stations?

It was urged at the recent Geneva congress that there are already too many European stations in operation, and that some of them should be

closed down in the interest of the majority of listeners.

The point was made that to give even the present number of stations sufficient "elbow" room to prevent overlap and interference in the ordinary type of receiving circuit, a further wavelength range of from 1,000 to 2,000 metres would be required, in addition to the existing allocation of 200 to 600 metres.

This extension is quite impossible having regard to existing commercial, marine, and aviation requirements, to say nothing of the various military and naval services.

There is already evidence in certain quarters of a desire to replace the bulk of the small relay and low-power stations by a smaller number of super-power broadcasting centres.

On the other hand it has also been proposed to shift the broadcast scale down to the shorter wavelengths round about 150 metres.

(Continued on page 550)

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A WIRELESS ONE!

LOUD
SPEAKERS from 25/- each

HEAD
PHONES from 12/6 pair

Call and inspect our huge stock
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Electrical and Wireless Engineers.

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(One door from Queen Victoria St. and Queen St.)

and at 45, EASTCHEAP, E.C.3.

Tele. : CITY 2972.

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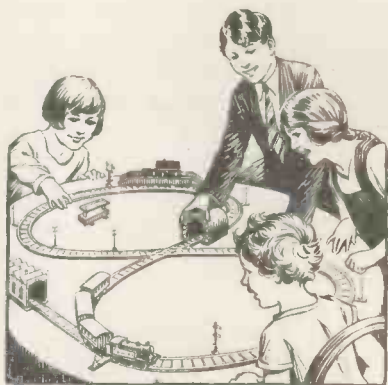
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Bing are Best

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Safe for High Voltage and Heavy Loading. MADE BY COIL-WINDING SPECIALISTS.



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Prevents accidental Short-Circuits. The Plate Socket is indicated by Red and is shorter than the others. With terminals for surface wiring. Price 2/3. Without terminals for surface wiring for panel mounting - 1/6.



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Protects your Valves from being burnt out. Blue Fuse 0.3 amps. Red " 0.5 " Green " 0.75 " Black " 1.0 " Price, 1/6



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JOTTINGS ON THE MONTH'S PROGRESS (Continued)

The latter remedy, it is claimed, would enable double the present number of stations to operate, and at the same time would lessen existing interference.

The difficulty here lies in the fact that the standard type of receiver has not been designed to deal with short wavelengths of this order, and broadcast listeners in general do not want to have to scrap their present sets and invest in new and more costly outfits.

It is certain, however, that some change will become necessary in the near future, and it will be interesting to see in which direction the remedy will be found.

* * *

Wireless-controlled Battleship

The target ship *Agamemnon*, recently used for gunnery practice by the Mediterranean fleet, is entirely controlled by wireless. Without any crew on board she can be stopped, started, reversed, controlled in speed, and generally manoeuvred at will. Her engines and steering apparatus

are fitted with sensitive relays which are operated in any desired sequence by means of wireless signals transmitted from a distance by the destroyer *Shikari*.

This forms a striking illustration of the possibility of the wireless-controlled battleship, capable of going into action without a crew.

* * *

New Control Cabinet for B.B.C. Studios

The latest improvement for supervising microphone operations in a broadcasting studio consists of a sound-proof cabinet occupied by the announcer or producer. There are four control switches, three of them connected with separate studios, whilst the fourth enables the announcer to cut out everybody's voice but his own.

In this way announcements can be made whilst the band is tuning-up, or whilst the microphone victim is getting his last word of advice, and no indication of these preliminaries can possibly "get through."

Earliest Forms of Wireless

A claim has lately been made in the daily press to the effect that a Scotchman named James Bowman Lindsay was the first to discover wireless telegraphy in the year 1854. Lindsay certainly did send signals in 1858 across the Tay at Glencarse, where the river is about half a mile wide, but the results obtained were purely inductive, that is, they were due to the magnetic fields from one conductor spreading outwards and inducing currents in a distant wire, as in the leader-gear system.

There was no true radiation as we know it to-day. It is also interesting to note that Professor Morse as early as 1842 succeeded in sending telegraphic messages across a distance of nearly a mile, near New York, by inductive or leakage action through the earth, a long "transmitting" and "collecting" wire being arranged at each end. Professor Steinheil secured similar results in Germany at a still earlier date, 1837. B. A. R.

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*A Loud Speaker
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with a horn attached*



Nickelled Base Frosted Horn, 21/-

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WAVE METER

Measures from 25 to 25,000 m., and is guaranteed accurate within 1½ to 2%. Equally suitable for calibrating inductances and capacities. Price complete with 4 coils and 5 calibration charts for standard range of 80-4,500 m. or as required.

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The All-Important Variable Condenser

And the Prestige behind the "Polar"

Not all variable condensers can be judged by appearance and price alone. It is unlikely that the condensers produced by any but long-established Radio Engineers can be fully efficient.

The "Polar" Junior Condenser.



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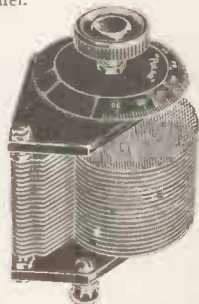
All Capacities.

Possesses all the characteristics of the well-known Polar "Straight-line-Frequency" condenser. Gives a straight line of frequencies with an approximately even movement of dial in relation to change of wavelength. Low minimum self-capacity; one-hole fixing; 350 degrees dial; perfectly screened; remarkably compact; occupying minimum space behind panel.

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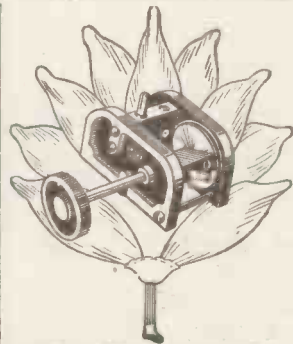
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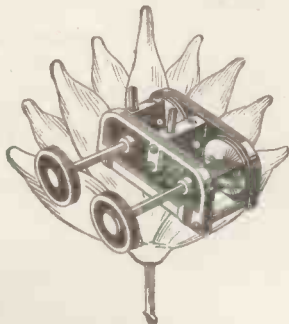


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"LOTUS" COIL HOLDERS

are made from Bakelite mouldings with nickel-plated fittings; they are an ornament to any set and they give the best results.



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"I should like to take this opportunity of saying how glad I am that I fitted your coil holder. I can now, without any other alteration in my set (Det. L.F.), receive 6 stations with comparative ease, where before tuning in of 3 was an achievement."

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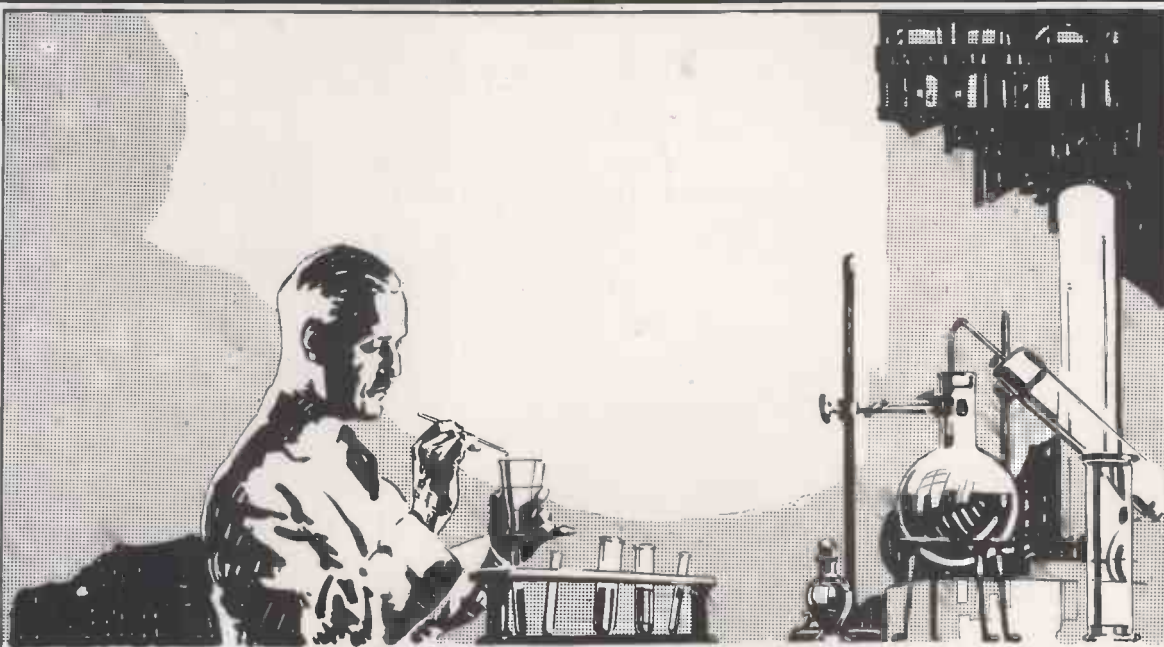
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"The Wireless Magazine" Buyers' Guide

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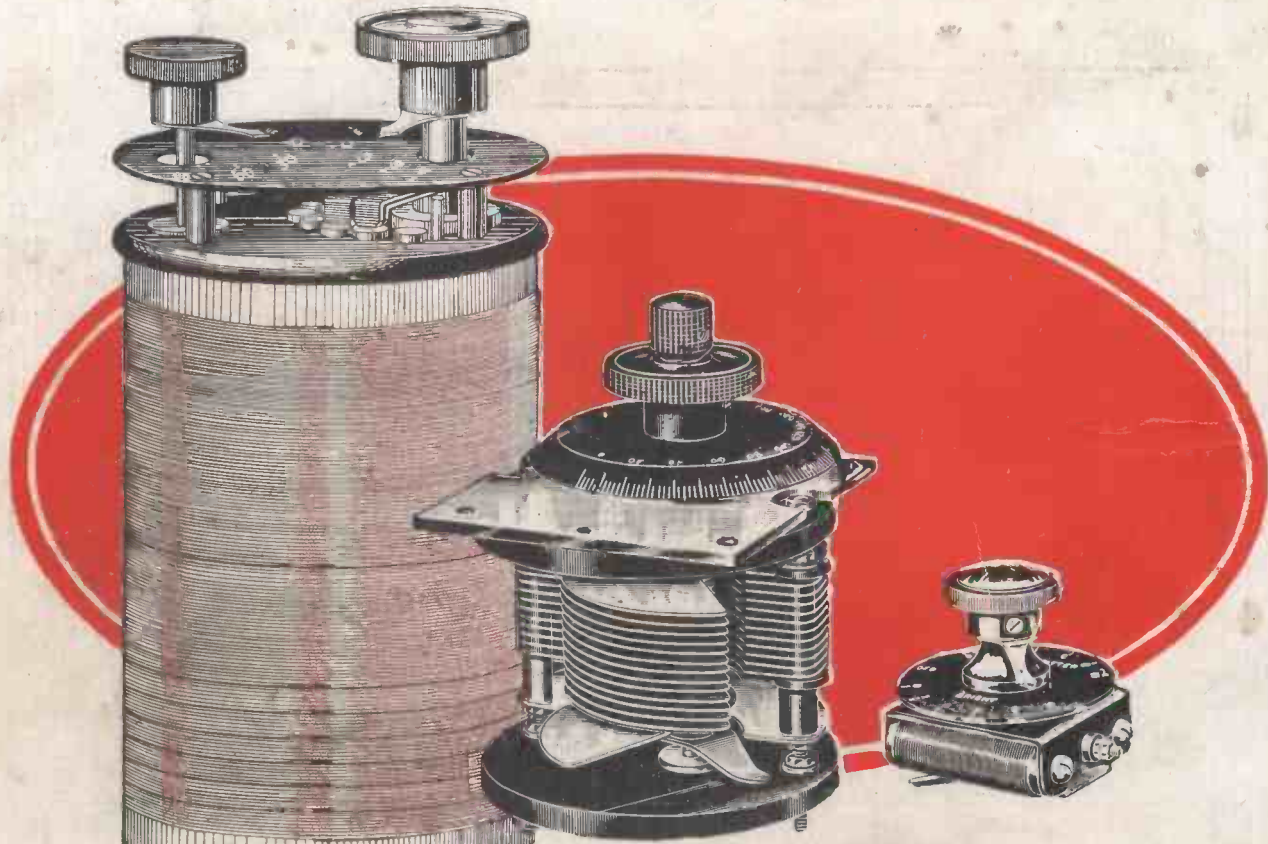


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Write for the new R.I. Blue and Gold Catalogue, free on application.



All the above components are recommended in circuits described in this issue of "The Wireless Magazine."

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