THE NEWEST OF LOUD-SPEAKERS

Amateur Wireless And Electrics

Vol. V. No. 129. SATURDAY, NOVEMBER 22, 1924 Price 3d

PRINCIPAL CONTENTS

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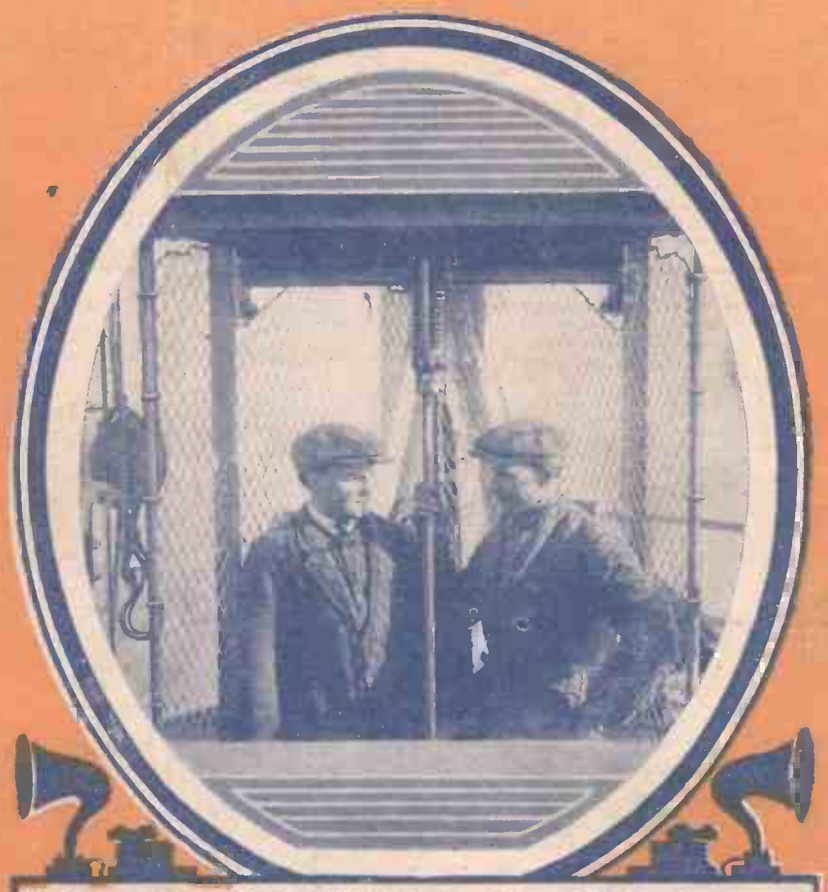

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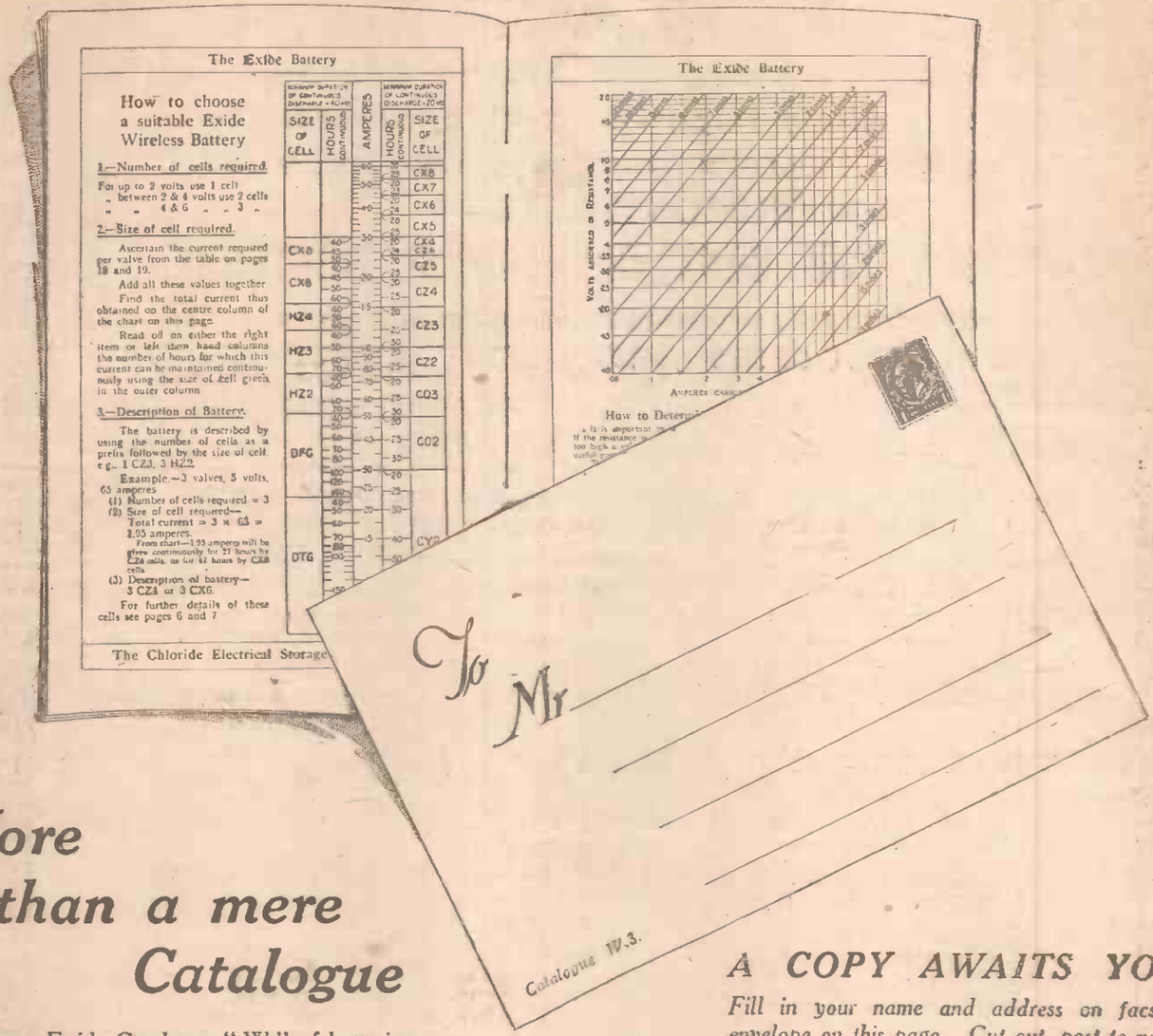

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Amateur Wireless
and Electrics
Vol. V. No. 129 November 22, 1924

THE MOON AND LONG-DISTANCE RECEPTION

NOW that so many amateurs are interested in long-distance reception, the old question of the moon and its relation to wireless is undergoing a fresh examination. In many cases the results of this examination do not accord with expressed expert opinion. I think I am right in saying that the accepted theory is that the moon has nothing to do with signal strength or, indeed, has any effect upon wireless at all. This is rather difficult to believe, as many amateurs are discovering for themselves.

Being especially interested in long-distance work, I was led some time ago to attempt the compilation of a systematic chart showing signal strength in relation to changes of the moon. This chart was compiled from the reception of several American broadcasting stations and covers a period from August to the present date. K D K A has been used for short-wave work and W B Z for long-wave work, with occasional reference to W G Y and W F Y.

I have not been able to find that there is any reduction of signal strength when the moon is full. But several other interesting points have arisen out of my experiments.

Fading on American stations is a curious phenomenon. Very often a certain effect is obtained which is, in my opinion, erroneously called fading. Most people with powerful sets will have noticed the marked "wave" effect on an American transmission, the signals appearing to come in waves of standard duration, say about three minutes between the apices of strength.

A listener with a set which is only just capable of tuning in this station will imagine the "wave" effect to be fading, for he will only hear the signals when they are at their loudest. But the signals are not fading. Actually they are increasing every now and then to an entirely fictitious value above an average mean strength.

But for all that American stations are subject to a certain amount of real fading. And there is always a greater tendency to fade when the moon is full. I have quite established this to my own satisfaction.

It is a curious fact, for there appears to be no theoretical reason why the moon should influence fading, especially if, as I personally think, that unpleasant bugbear is not so much a natural phenomenon as is generally supposed.

Another point which systematic observation will establish beyond a doubt is that the moon does affect static.

I have found without exception that the nights just preceding and just following a full moon are the worst possible for carrying out long-distance reception. K D K A, for instance, working on the short wave, is usually practically free from atmospheric effect even when stations working on the longer wave are unreadable. Yet on a night when there is a full moon K D K A is subject to static interference.

The effect upon these shorter waves is somewhat curious. Static does not express itself in the crashes and bangs to which we are accustomed but in a kind of Morse effect, lowering the strength of the modulation a little without affecting the carrier wave.

The static does not intrude itself upon the received signals and they are always readable, but one is conscious of it in the background, and it breaks up the continuity of the reception into a sort of jagged series of dots and dashes.

During this phase of the moon there is also a great tendency for a perfectly stable set tuned to a point well off the oscillation mark to tip over and howl at periodic intervals. If it is left alone, which, of course, is not possible on account of the interference caused with other listeners, it will, after a few moments, subside again.

And when the shorter waves are subject to this static interference during the full-moon period the higher wave band is usually an absolute impossibility. I have very rarely been able to tune in a 300-metre wave station during the full-moon period, and then it has required an effort of will to keep the phones on one's head.

At most times it is possible to tune in a station like W G Y even when there is static interference by detuning the aerial condenser and adjusting the reaction, but on a full-moon night this does no good, the ratio of static and signal strength remaining the same however much one detunes.

There are technical questions which arise, of course, but I do not propose to discuss them at this stage in my experiments. There is undoubtedly considerable field for intensive and systematic research into the relation of the moon to wireless and, more especially, to static. It is not a subject which we can afford to dismiss or regard casually if we wish to perfect long-distance reception.

And there is work for the absolutely untechnical enthusiast here, for he is able to compile data. In order to be able to ascertain anything of real value it would be necessary to have information from all parts of the country comparing signal strength and static with the phases of the moon, and these could be compiled by anyone using a standard receiver who was prepared to give the time to the task. Personally I think that concentration upon the shorter wavelengths would be beneficial.

E. C. D.

DISPENSING WITH THE H.F. VALVE

THE following notes will be appreciated by many who employ one or more stages of H.F. amplification.

Undoubtedly increased selectivity can be obtained by the addition of the tuned circuits as shown at A and B (Fig. 1). If a station can be heard with a strength which apparently does not require the extra amplification of an H.F. valve, it is usually a tedious operation to alter the reaction coupling to a different circuit, consequently the H.F. valves are used whether they are required or not.

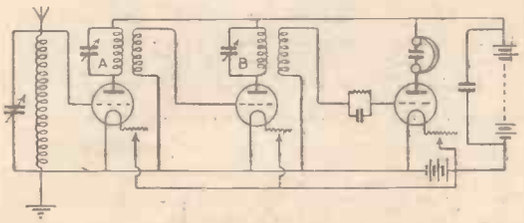
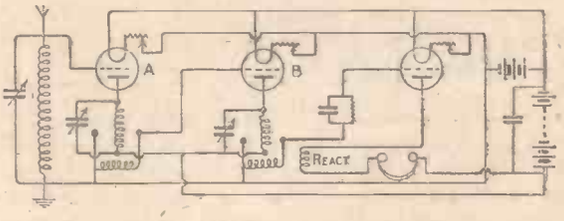
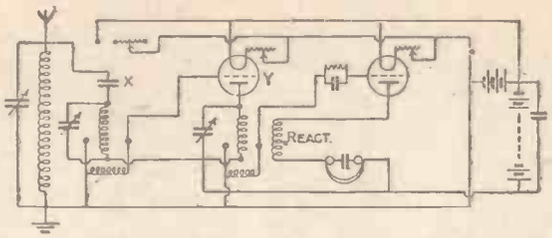


Fig. 1 (left).—Diagram showing Tuned Circuits.

Fig. 2 (right).—Ordinary H.F. Transformer Coupling

Fig. 3 (below).—Circuit with Added Condenser.





A simple yet effective means of retaining the selectivity of the original circuit and still using the same reaction coupling, although dispensing with the valve, is to plug into the valve holder a small condenser across the grid and plate terminals. This can be easily made up from a broken valve cap in a similar manner to the recognised "plug-in" transformers. The best value the writer has found in use is .0003 microfarad.

Fig. 2 shows the ordinary method of H.F. transformer amplification. (No doubt changing the grid potentials on different valves will give in some instances clearer and stronger reception.) If signals are unnecessarily strong the valve A can be taken out and be replaced by the new plug-in condenser across the grid and plate. A condenser with good insulation is necessary, as the shorting of this condenser will mean a consequent shorting of the H.T. battery, as will be seen in Fig. 3.

The plug-in condenser is shown in Fig. 3 at X. In this diagram one valve only is dispensed with, but a similar condenser can be put in place of the valve Y. This method of valve saving can undoubtedly be applied to the popular tuned-anode circuit, but as the writer has not actually tried this he refrains from giving details. E. W. S.

THE ART OF TUNING

EVEN to-day there are many real enthusiasts who find it a matter of no little difficulty to manipulate their sets in tuning-in distant stations, the picking up of which should not be particularly difficult with the apparatus they have available. Too often the receiver is blamed for its non-success, when the cause of poor results lies in the clumsiness of the human element. This is a point of greater importance than is generally recognised, for to a very large degree the man in control makes or mars reception. The forceful "twirler" will never achieve anything notable in the way of long-distance work. It is the man with the sensitive touch who brings in America on a single valve.

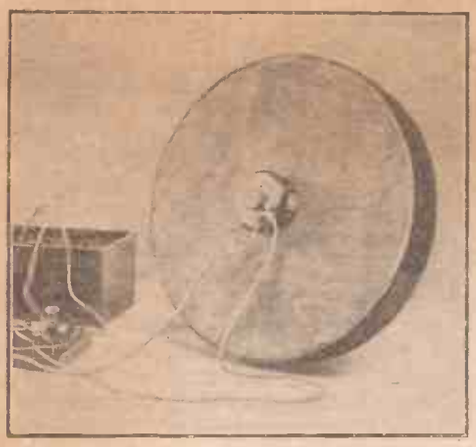
There is an art in tuning. For those who can learn that art the only necessities are practice and a thorough understanding of what they are doing when they make the various adjustments. In the commoner types of apparatus the fine tuning is done by means of condenser and reaction, but some preliminaries must be gone through before the stage is reached at which these are brought into service. First of all, it is a good plan, for the preservation of the valves, to connect up the accumulator or other source of filament supply to what are believed to be the appropriate terminals on the panel. Then the valve rheostats should be turned on a little. If the filaments show illumination the connections have been made correctly, and the H.T. battery can safely be put in circuit. The other connections—aerial, earth and telephone—should also be gone over to see that all are O.K.

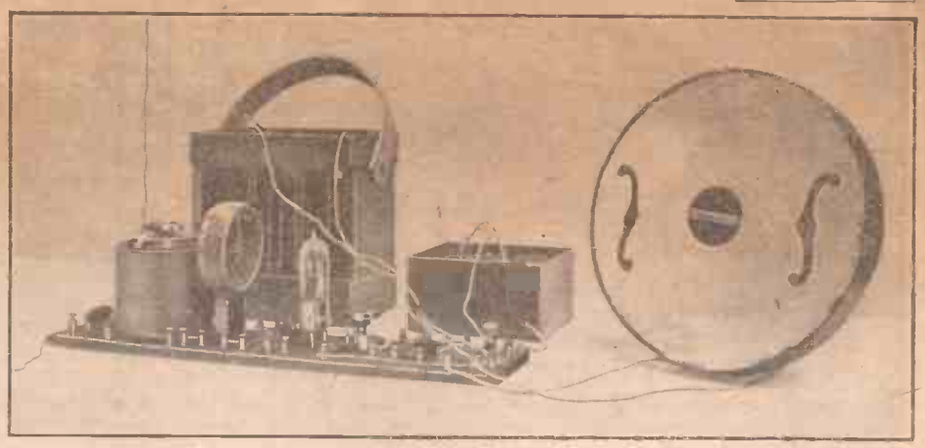
Then the valves can be lighted, always bearing in mind that in doing so the knobs of the resistances should be moved round gradually and that there is no advantage to be gained by having the valves too bright. The best point is frequently reached before the current allowed to pass to the filaments is the maximum possible. Too much voltage on the filaments, though it may not always bring instant disaster, assuredly means a big slice off the life of a valve.

Now for the tuning. Amongst persistent searchers-out of far-off transmitters the following method is in common use. The reaction coil, an instrument of torture in the hands of the inexpert and the most sensitive part of a valve outfit, is brought back to zero. The condenser knobs are steadily and carefully shifted backwards and forwards along the whole extent of the scale, and in a series of the slightest possible movements reaction is gradually introduced

When faint signals are heard at any particular stage the movement of the condenser should be stopped immediately and the coil brought up until the signals lose their original clear-cut sound and a hiss is perceptible in the phones. The hiss is a warning and shows that any further increase of reaction will cause howling, which is to be studiously avoided. To keep the signals "in" it will be now found necessary to make slight readjustments of the condensers while the reaction coil is being moved. This is essential because of small variations in the tuning which are so caused. Signals are at their best and strongest when the hissing is just noticeable but not too loudly prominent.

If listeners do their tuning on some such system as this they will discover that it brings more success and enjoyment to them in their own efforts, while they can also have the satisfying reflection that they are not causing interference. G. A. F.





THE NEWEST OF LOUD-SPEAKERS

THE loud-speaker shown by the photographs is of German origin, the inventor being Herr Ibach, the well-known piano manufacturer. The principle involved is similar to that of the pleated-paper loud-speaker, which has been already described in "A.W." In this case, however, the entire construction is of wood, with the exception, of course, of the reed earphone which it is essential to use. It will be recognised by those who have some knowledge of sound reproduction that the device is nothing more or less than a sounding-board.

The only tools required for building the instrument are a fretsaw and a screwdriver.

Fig. 1 shows the loud-speaker in section and it will be obvious that its construction is simplicity itself.

The diameter of the instrument is 10½ in. The diaphragm (Fig. 2) should be cut from $\frac{1}{16}$-in. pine wood if this is available. The author, however, was unable to obtain pine and had to be content with sycamore $\frac{1}{8}$ in. thick. Wood of this thickness is rather tricky to work, but it gives excellent reproduction. All the necessary wood may be obtained from Hobbies, Ltd., the well-known fret-work dealers.

The ideal construction would be for the front and back boards to be glued direct to the side, but the average amateur will probably find this beyond his capabilities. In the present case eight oak blocks measuring 1¼ in. by ¾ in. by ⅜ in. were cut to support the front. The back board is shown by Fig. 3 and the blocks were arranged as shown in Fig. 4. They were secured by glue and one small screw in each block.

The Front Board

The front board, prepared as shown by Fig. 2, is attached in the same manner. In cutting this the centre circular hole should be cut first and the scroll-shaped holes afterwards. In order to ensure that both of the latter are the same, the desired shape may be first cut from a piece of cardboard and this used as a template, the shape being reversed for the opposite hole. A small bridge piece (Fig. 5) is attached at the back across the centre hole as shown in Fig. 1.

After the front board is glued and screwed in position, a piece of very thin three-ply wood is glued and screwed to the blocks to form the sides.

Finishing

The next step is to varnish the case. The writer endeavoured to obtain violin varnish for this purpose, but as the price of this was prohibitive, artist's varnish was used instead.

The operating mechanism consists of a Brown reed-type phone with a piece of brass wire threaded the whole of its length (No. 10 B.A. thread) screwed into the hole previously occupied by the screw which ordinarily holds the diaphragm in place. The ebonite cap of the phone with the centre hole enlarged is secured to the back of the instrument by means of two screws.

The body of the earpiece is screwed into the cap when the latter is in position and the No. 10 B.A. rod passed through the hole in the centre of the small oak crosspiece. Two nuts placed on the rod are so adjusted, back and front, that the relative positions of crosspiece and phone are correct.

A. J. C.

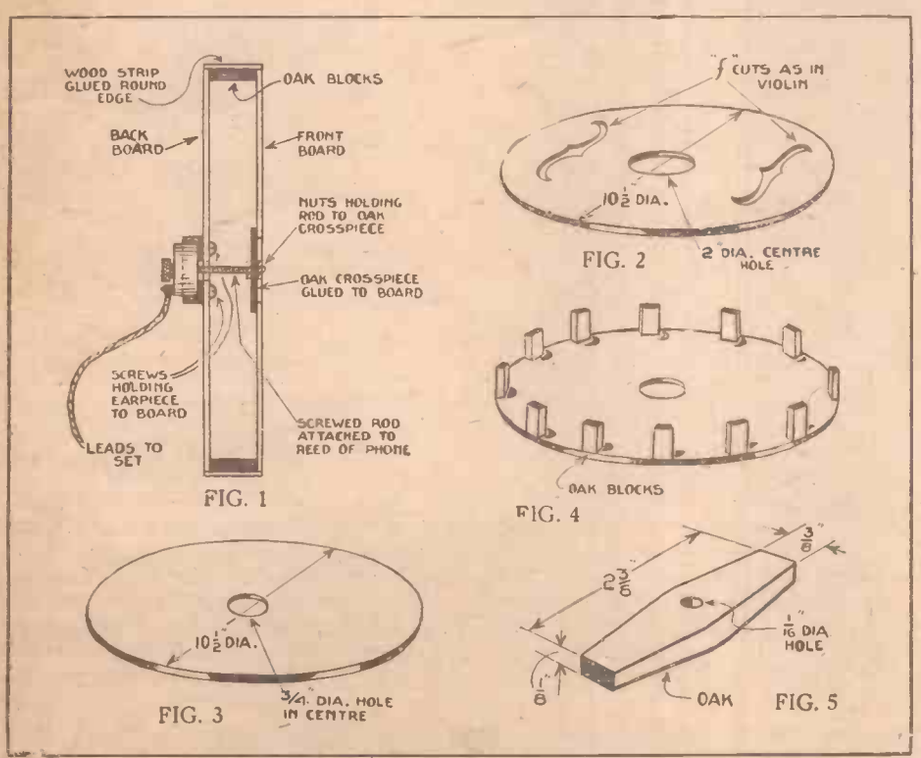


Fig. 1.—Section of Loud-speaker. Fig. 2.—Front Board. Fig. 3.—Back Board. Fig. 4.—Arrangement of Side Blocks. Fig. 5.—Oak Cross Piece.

EXPERIMENTAL TRANSMISSION.—IV

EARTH SYSTEMS

WE are now faced with the problem of the lower capacity, but here we have only two alternatives to consider, the counterpoise and direct earth.

The Counterpoise

The counterpoise is essentially a second aerial, preferably of the flat-topped fan-shaped type, supported at a height of about 8 ft. from the ground immediately underneath the aerial and just as carefully insulated as the latter.

It is obvious that here we have many distinct advantages over the direct earth. The actual ohmic resistance may be reduced from the colossal resistance of the usual water-pipe earth to the small figure of about 3 ohms. Unlike the buried-plate earth, the value for Rg is nearly constant and does not vary very much with atmospheric conditions. It has, however, two disadvantages, in that the actual construction is a little more difficult and that the fundamental of the aerial system is slightly altered. These, however, do not counteract the great improvements gained in the reduction of Rg.

The counterpoise, as already stated, should preferably be of the flat-topped fan type (Fig. 11), the wires converging from a position about 100 ft. away to a spread of about 24 ft. It is absolutely essential that the counterpoise should have at least as high a capacity to earth as the aerial possesses, and therefore should consist of approximately the same number of wires as the aerial itself.

The wires should be supported at a convenient height above ground (about 6 to 8 ft.) on well-insulated wooden posts. The insulation of the whole system must be just as carefully attended to as in the upper capacity, especially at the lead-in end. Fig. 5 (No. 126, p. 639) shows that I is greatest in the earth lead. Stranded wire or copper strip must again be employed.

It may appear that the use of a counterpoise introduces many unnecessary complications and extra expense, but such a decidedly greater value of aerial current It is obtained that the use of a counterpoise is always to be strongly recommended.

Direct Earths

A direct earth, if used, should consist of buried metallic bodies, plates or good lengths of wire which present large surfaces to the ground. Copper netting or old army earth mats may be used. They should be well packed with coke to ensure that the surrounding earth may be easily kept moist.

The essential points about direct earths are: (1) An extremely large surface must be presented to the ground if a large value for the aerial current is desired; (2) the surrounding soil must be kept very moist to ensure good contact; (3) all joints must be soldered and the lead-in from the earth should be as short and thick as possible.

Where a really good direct earth is available, it is advisable to insulate carefully the earth lead up to the point of actual contact with the ground, as the earth connection will then more nearly represent a counterpoise in action and will have less resistance.

It is common practice in many stations, especially where a good direct earth is not available, to connect all adjacent metalwork, gas- and water-pipes, etc., together and employ these as the lower capacity. Many curious effects may result by so doing. If each individual earth is inefficient by itself, an increase of aerial current may result owing to the larger surface presented for contact with the ground and also possibly due to the lower total resistance of a number of parallel resistances. If, however, any one of the earths would by itself be sufficient, and this earth is put in parallel with others less efficient than itself, then a fall of aerial current will most certainly result owing to lack of balance, the antenna currents being unequally divided. Only in very special cases where each individual earth is poor is the system of multiple earths to be recommended.

Provided that the experimenter does not mind the slight extra trouble involved in extra tuning, a tuned counterpoise or tuned earth may be used in combination with every chance of a resulting increase in It; this scheme is shown by Figs. 12 and 13.

The essential point to be noticed, of course, is that both earth and counterpoise are exactly in tune. In practice maximum results have to be obtained on the counterpoise alone, and the earth tapping is then adjusted until no diminution of aerial current results and until the wavelength of transmission is not changed by connecting or disconnecting the direct earth. The latter and the counterpoise are then in tune.

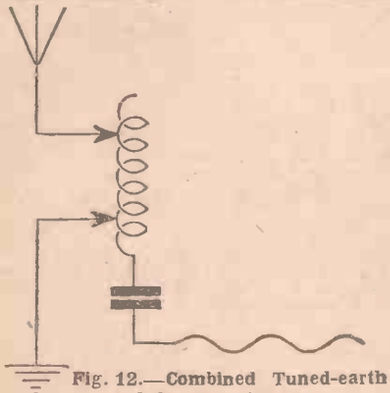


Fig. 12.—Combined Tuned-earth and Counterpoise System.

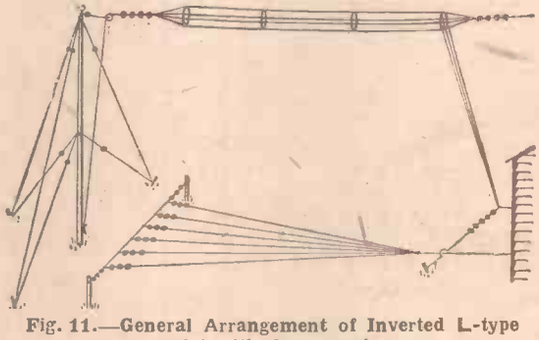


Fig. 11.—General Arrangement of Inverted L-type Aerial with Counterpoise.

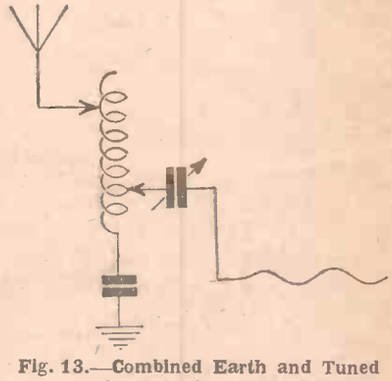


Fig. 13.—Combined Earth and Tuned Counterpoise System.

If desired, the process may be reversed. The set must then be adjusted for maximum results on the direct earth, and the counterpoise is then brought into tune. The former method, however, will most likely prove to be the easier.

Special Types of Antennæ

Up to the present types of antennæ have been dealt with that will prove most useful for general work. There are still three other classes of antenna to consider:

(1) Directional aerials.

(2) Aerials for duplex work.

(3) Artificial, phantom or dummy aerials.

KENNETH ULLYET.

(To be continued)

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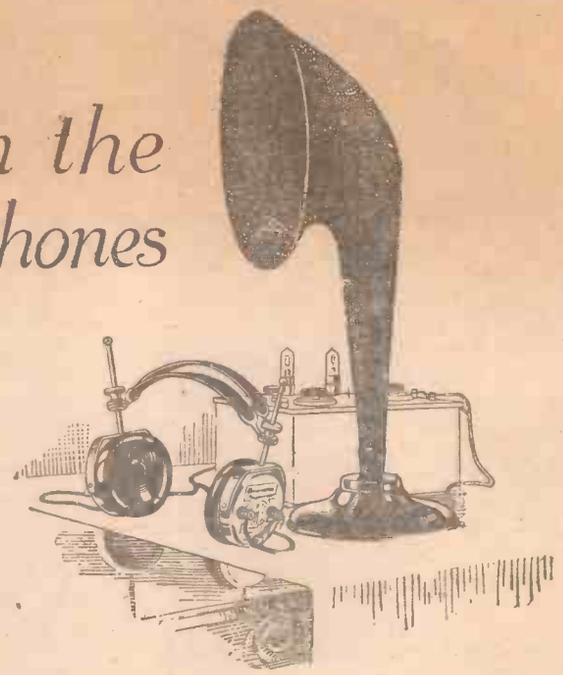


All Brandes products carry our official money-back guarantee, enabling you to return them within 10 days if dissatisfied. This practically constitutes a free trial.

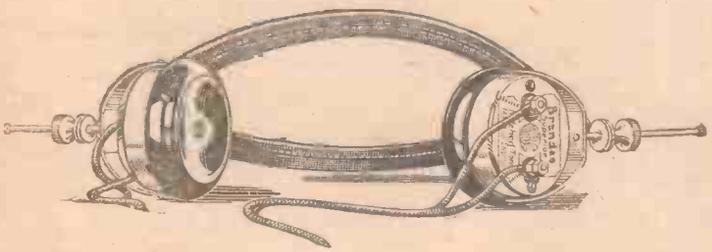
The *"Matched Tone"* feature means that both your ears hear exactly the same sound at the same instant—and you learn a new beauty of tone. They are tested and re-tested for just this one vital point, and in addition their strength, long-wearing comfort, and reliable efficiency make them undoubtedly superior.

25/-

The *Table-Talker* is a Brandes quality product at a moderate price. The non-resonant, specially constructed horn is matched to the unit so that the air resistance produced will exactly balance the mechanical power of the diaphragm. This means beautiful sound-balance and remarkable tone qualities. It is twenty-one inches high, has a self-adjusting diaphragm and is finished a shade of neutral brown.

42/-

British Manufacture (B.B.C. stamped).



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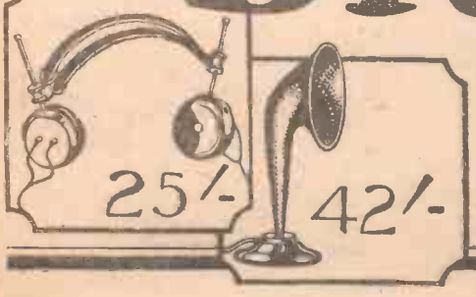

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Watch your Dealer test a Cossor Valve —no need for him to open the Box

ONE of the principal difficulties that has to be faced by every Valve Manufacturer is to ensure that his Valves reach the user in the same good condition in which they leave the factory.

Many prominent Radio authorities and journals have consistently advocated some form of sealing which would prevent any Valve being used—even for demonstration purposes—before being sold. It has remained for A. C. Cossor, Ltd., to work out a patented packing scheme which is of the utmost benefit to the trade and user alike.

The idea is simplicity itself. The Valve is securely packed in a thick layer of cotton wool, and sealed in its carton. To each of its filament legs has been attached a copper wire brought through the packing and connected to a couple of brass studs on the

TYPES and PRICES.

P1. For Detector and L.F. use 12/6
F2. (With Red top) for H.F. use 12/6

WUNCELL DULL EMITTERS

Model A. (*With resistance in base for use with 2-, 4-, or 6-volt accumulator*).
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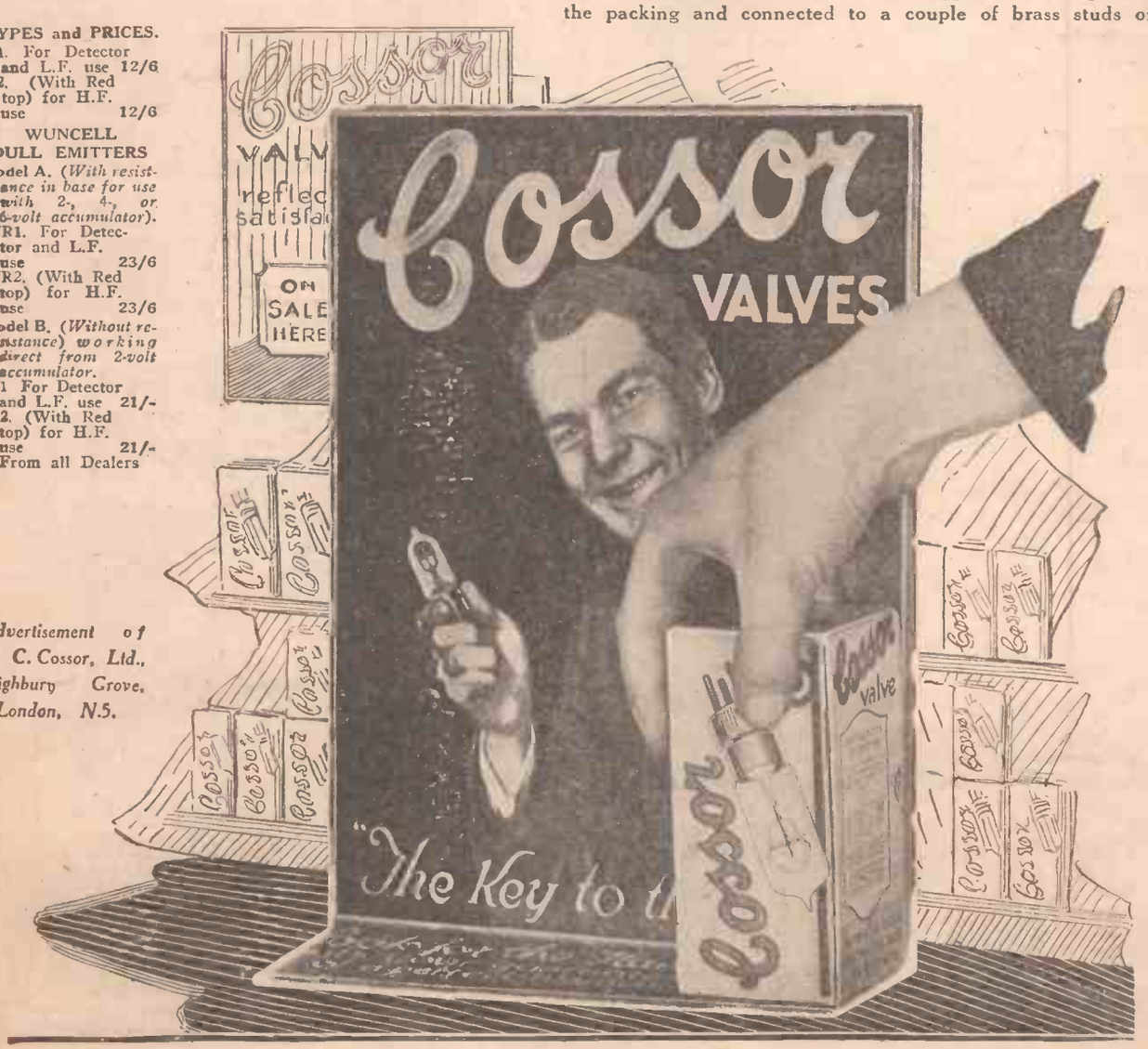
W1 For Detector and L.F. use 21/-
W2. (With Red top) for H.F. use 21/-
From all Dealers



Advertisement of A. C. Cossor, Ltd., Highbury Grove, London, N.5.

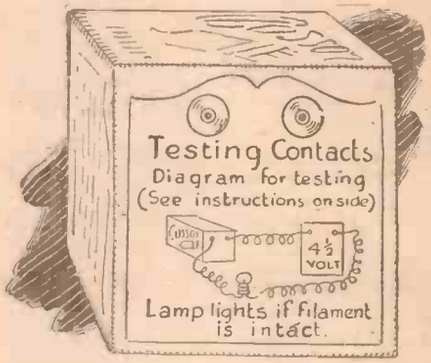
Valves

sealed cartons

exterior of the carton. It will be obvious that if these two studs are placed in circuit with a flash lamp and battery the current will pass through the filament and—completing the circuit—cause the flash lamp to light. If, on the other hand, the filament is broken, the current cannot pass, and the lamp will not light.

This idea is incorporated in an electrical Showcard supplied to all Dealers. All that he has to do is to pick up the Cossor *sealed* Carton containing the Valve, and place its studs in contact with two metal strips on the Showcard. If the Valve is in order the miniature lamp behind the showcard lights up—*he need not break the seal at all.*

If you want to be sure of getting a Valve with a full life, therefore, be sure you choose a Cossor—the only one that is guaranteed a safe passage from factory to user.



Above: The end of the Carton showing the metal contacts and circuit diagram of the Showcard.
Below: The new Cossor box—every Cossor Valve irrespective of type is being packed in this method.

Every Purchaser gets an unused Cossor Valve—

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Seven features you cannot get with any other Valve

1. An arched filament which entirely supports its own weight and which does not require springs or other forms of tension to prevent it from sagging. This makes for long life for the Valve.
2. A hood-shaped Grid—scientifically built up on stout metal Grid band—with every turn of its wire anchored in three distinct positions. This guarantees complete freedom from microphonic noises.
3. A hood-shaped Anode completely enclosing the Grid and filament and thereby making use of practically the whole of the electron stream. This ensures greater sensitiveness.
4. A special type of Valve—known as the Cossor P.2 (the Valve with the red top)—which has been specially designed for high-frequency amplification. This means that Stations—hitherto out of your reach—can now be picked up with certainty.
5. A unique method of testing Cossor Valves by which every Valve is given a complete and costly series of tests before being issued. This ensures that Valves which, superficially, might look correct must conform to a definite scientific standard or be rejected.
6. And now a Dull Emitter which glows at a temperature which is practically invisible during daylight. The Wuncell is available with characteristics to match exactly the P.1 and the P.2. It operates at 1.8 volts and requires so little current that a small portable accumulator will last the average 3 valve Loud Speaker Set a fortnight on a charge at a cost of a few pence.
7. Finally, the new patent Cossor packing system—a method which will revolutionise the industry—is a genuine effort on the part of the manufacturers to strike out of the rut in the honest endeavour to see that Cossor Valves arrive at their ultimate destination in an absolutely new and unused condition.

On Your Wavelength!

The Jamming Question

I HAVE had an interesting letter from a correspondent who takes exception to my remarks on the difficulty of separating 5 X X from Radio-Paris. I said, if you remember, that though I could tune in 2 Z Y on 375 metres so that there was no interference from 2 L O on 365, I could not get rid absolutely of 5 X X on 1,600 when tuning in Radio-Paris on 1,780. He points out, quite correctly, that if one takes the frequencies, and not the wavelengths, there is an even greater gap between 2 Z Y and 2 L O than between 5 X X and Radio-Paris. The actual difference is 21,918 cycles between the short-wave stations and 18,961 between those which work on the high wavelengths. This being so, he argues that it should be easier to separate 2 L O from 2 Z Y than 5 X X from Radio-Paris.

This is all right so far as it goes, but what the practical wireless man has to deal with is not so much wavelengths and frequencies as actual degrees on his condenser scale. Now taking the readings of my A.T.C. I find that its setting at 365 metres is 31 degrees, whilst for 375 metres it is 38½, the difference being 7½ degrees. Using an appropriate set of coils for the higher-wave stations the A.T.C. scale readings are 72 for 1,600 and 104 for 1,780, the difference in this case being 32 degrees. This means that in separating London from Manchester you have only a tiny amount of condenser scale to work with, while between Chelmsford's tuning and that of Radio-Paris you have nearly one-fifth of your scale.

Even if square-law condensers are used the movement required to raise the wavelength from 1,000 to 1,780 is rather more than five times as great as that needed to tune from 365 to 375 metres.

Large or Small?

One of the great difficulties of obtaining selective tuning on the short wavelengths is that the smallest movement of the condenser makes a very big difference to the frequency. Those who make use of the large A.T.C.s that used to be fashionable always find it difficult to do anything like fine tuning on the shorter waves. Unless you have a vernier condenser in parallel, anything larger than about .0004 microfarad makes selective tuning a matter of considerable difficulty. In a set that is to be used for both long and short waves the best way, I think, is to fit an A.T.C. of about this value and to mount a couple of clips so that fixed condensers of various values can be placed in parallel with the variable condenser for use on the longer waves.

The only advantage of having a big aerial tuning condenser is that with it one inductance can be used to cover a wide band of wavelengths. However, if you obtain a really well made inductance whose self-capacity has been reduced by good design to something very small, and use with it a first-rate variable condenser with a very small minimum capacity, you will find that you can cover quite a wide range with the combination. In fact with a good *small* condenser and an efficient inductance the wavelength limits are usually greater than with a poor coil and a badly-made condenser of large size.

Variable Condensers

The variable condenser question is one which is receiving a great deal of attention from manufacturers, and I think that in this connection "A.W." may consider itself patted on the back as being one of the first papers to take up the question of condenser efficiency and to devote a large amount of space to pointing out the virtues of the square-law condenser. There are now on the market large numbers of really good condensers at reasonable prices, whilst many makers are turning out excellent square-law condensers quite cheaply.

2 L O's Birthday

By the time that these notes are in print 2 L O will have celebrated its second birthday. I wonder how many people remember now the curious time we went through two years ago. In the spring it was suddenly announced that the wireless restrictions made necessary by the war were to be relaxed and that anyone would shortly be able to obtain a receiving permit without any trouble. It was stated, too, that broadcasting as done in America would soon be an established fact in this country. Everyone rejoiced and thousands dashed off to buy wireless sets.

Then for several months we were kept upon tenterhooks by announcements of all kinds, by rumours, by statements and by contradictions. Broadcasting was to begin at once. Broadcasting was not to take place at all. It would begin next week. It would not begin for three years. And so on and so on. Then with almost startling suddenness the B.B.C. came into being and stations began to blossom everywhere. Almost before we knew where we were things were in full swing, and when you wanted to get into a wireless shop you had to place yourself in a queue in the street outside and possess your soul in patience for some little time.

It was a wonderful period, as all old hands will remember. If it had not been for Writtle to stabilise our spirits, which were inclined to rise and fall like the potentials on a grid, I do not know what would have happened. The early programmes from 2 L O were not of very long duration. There were no transmissions during the daytime and the evening broadcasting lasted, if I remember right, for about two hours. For quite a long time the entire work of running these stations, apart from the engineering side, was in the hands of Mr. Burrows and Captain Lewis, with Mr. Stanton Jefferies to assist them as O.C. music. However they managed to get through the work of arranging programmes, announcing, answering letters and doing a very solid day's work in the office I really do not know, but they did it and did it jolly well.

Early Days

In its infancy the B.B.C. was housed in one enormous room in Magnet House. I remember going to see Mr. Burrows one day when they were in those cramped quarters. There was a kind of little barrier just inside the door, forming a sort of pen into which about a dozen people all eagerly desiring to ask questions were crammed. When your turn came you passed from the pen into the main office. At the right-hand side of the room was a big table, at one side of which sat Mr. Burrows, whilst opposite him was Captain Lewis.

The whole of the office seemed to be filled with big tables, most of them surrounded by typists who were whacking away for all they were worth at their machines. On the left side of the door sat Captain Eckersley, complete with pipe and smile, also up to the eyes and also answering conundrums. It must have been a pretty hectic time, and I expect that when the original B.B.C. men look back on it from their present comfortable quarters they wonder how they ever contrived to survive.

The Old Studio

2 L O's original studio was situated at the very top of Marconi House. There was a lift, but it generally happened when I went there either that it had gone on strike or that the lift man was off duty for the moment. I do not know how many steps there were to be climbed, but I can recall on several occasions the wireless uncles arriving for the Children's Hour, the opening of which appeared to coincide with the lift man's tea-time, so short of breath that it took them some minutes to get into their proper stride.

The first evening I spent there was at quite an early date in the history of broadcasting in this country, and I remember hearing and seeing the first performance

On Your Wavelength! (continued)

before the microphone given by one who is now amongst the most popular of wireless turns. This was Mr. Ronald Gourlay, the blind pianist and whistler whose delightful mixtures of tunes, so apparently far apart as "Three Blind Mice," Rachmaninoff's "Prelude," and "Last Night in the Back Porch," are now familiar to all of us.

The microphone then was not the elaborate arrangement that it is to-day. It was simply a perfectly ordinary microphone provided with a little handle rather like that of a lady's lorgnette so that the speaker or the singer could hold it in his hand. In the ordinary way it was placed in a clip attached to a stand in the middle of the studio. Wires ran to this from all over the place, and people fell over them at intervals. When a singer went to the piano somebody had to hold the microphone in the right place during the performance. One little source of trouble was the switch which brought it into action. Sometimes it was left on when it ought not to have been, so that conversations in the studio were broadcast far and wide, and sometimes again it was not turned over while a genuine item was in progress. Yes, these were great days.

Spoonerisms

The microphone appears to produce a peculiar kind of nervousness in many speakers, probably because it is so utterly unresponsive. I have often wondered for this reason that it has not produced more spoonerisms. One does get them occasionally, as, for instance, when a few weeks ago at a certain historic ceremony the chief speaker congratulated the B.B.C. on opening the Belfast broadcasting station. But this is one of the very few gems that one has been able to collect. Once in a shop I heard an enthusiast demanding to be served with a Greek lid. The assistant rushed him off to the hat department before he was able to explain. There is also the story of the lecturer who turned kilovolts into vilokolts and kolovilts and volokilts, until finally he got so tied up that he had to give up the attempt and refer thereafter to thousands of volts.

The Ship's Chronometer

I wonder if it has ever occurred to my readers, when listening to the official time signals, what an immense boon wireless has conferred on those who go down to the sea in ships. In the old days a ship's captain had to have a time-keeper which he could absolutely trust, and the chronometer became perhaps the most important instrument aboard. To obtain a really dependable timepiece he did not hesitate over the expenditure of a good many golden sovereigns, and if disaster came and the ship had to be abandoned, the chronometer went with the captain, carefully guarded by hand, so as not to suffer the slightest jar. An error of a few seconds in his chronometer might cause a considerable defect in his dead reckoning, which would throw the captain right off his course and maybe pile the ship upon the rocks.

Nowadays this is unnecessary. A ship can be navigated, if need be, by a good watch costing perhaps only a pound or two. The reason for the change is the prevalence of daily time signals, such as are now sent out by scores of stations all over the world. Ships on every ocean can pick them up daily and correct the chronometer by which, together with observations of the stars or the sun, their position at sea is determined.

Wireless as a Home-maker

There is still another aspect of wireless, often stressed but always worthy of stressing, which may have a far-reaching sociological effect on present-day history. This is the often-mentioned advantage of wireless in keeping the younger members of the family within the home at nights instead of on the streets. In Sweden, at any rate, this effect has been so pronounced as to have won Government recogntion. In a decree announcing some additional encouragement to wireless development, the Swedish Government speaks of the assistance of wireless to "the renaissance of family life." Home-making proper is contingent upon the interest taken in home life by the family and in the cohesion of the family circle.

In some quarters we have heard or read of wireless as a home-breaker, and the wives of enthusiastic amateurs have been pathetically referred to as "wireless widows." But in a far larger number of cases—in my experience, at least—where the younger members have been attracted to it, wireless has proved the means of keeping them within the home and away from many of the more questionable sources of amusement outside. I would say, then, "Hail to wireless—the home-maker!"

"06" Valves

I have been delighted recently with the performances of a couple of "06" valves which I rigged up on a small set. One imagines somehow that these little fellows, using only about one-tenth of the juice required by the bright-emitter, cannot possibly deliver the goods. I confess that I was distinctly prejudiced against them before I gave them a fair trial.

As a matter of fact, if you use them carefully and don't run them too brightly they perform nearly as well as the best bright-emitters and they are quite as easy to work with. It does seem absurd, though, to have to use a milliammeter to discover the *filament* consumption of your valves. But that is what you have to do for the ordinary 0 to 10 ammeter is quite useless, its needle making so slight a movement when you switch on that you have to watch very carefully to see that anything at all is happening.

Nor do I find these expensive little things particularly fragile. I don't mean to say that you can throw them about the room as you can the Myers valve, which simply refuses to break even if you bounce it, as I have done, on a stone floor; but the "06" valves do stand up well to their work, and when I dropped one accidentally the other day several inches on to the bare top of the table it came up smiling after the bump.

Uncle Bernard

I rather wonder if a new uncle will be made at 2LO after to-night when Mr. George Bernard Shaw reads one of his own plays, *O'Flaherty, V.C.* I do not see, though, why it should be S.B. to all stations except Belfast, because that is either going to give the Free State cause for another political grievance or rejoicing. I do not foresee any special run on the other works of G. B. S. either, for he is like caviares or olives, an acquired taste, and one which he himself gained very early in life. It is interesting to note that he commenced his early dramatic career as playwright for the Salvation Army with *Major Barbara*.

A Unique Show

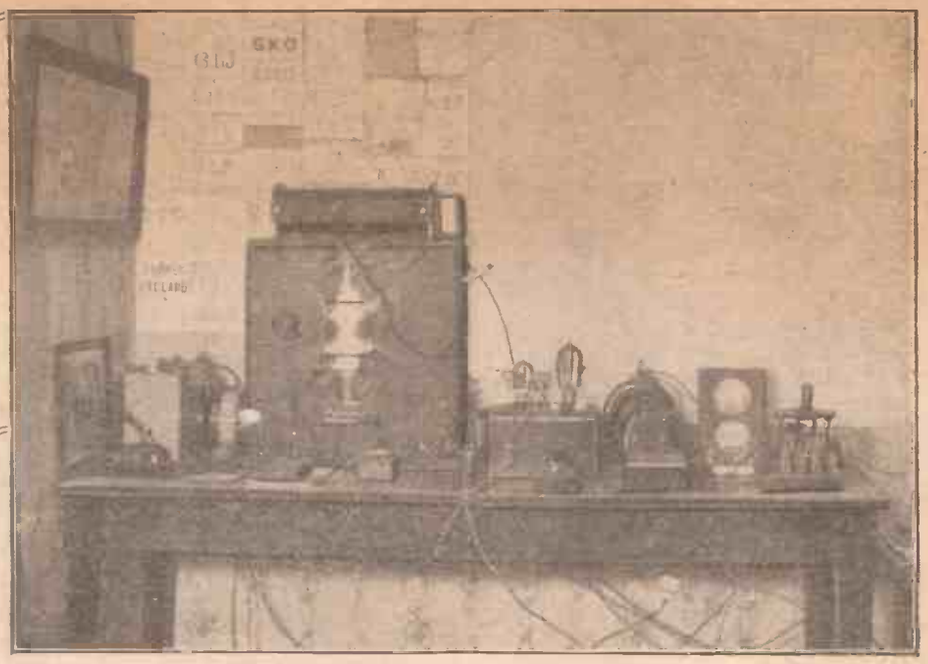
I have endured many public processions in my time, but this year, thanks to wireless, I actually enjoyed one! And no less than the Lord Mayor's Show at that. By hearing it first and seeing it later (yes, on the pictures!). I had all the excitement and thrill of the noise and blair, without the physical discomfort, while with those two inimitable artistes John Henry and Helena Millais I could vividly recall other shows when I, too, was part of the "heterogeneous mass" which usually forms the approving "chorus" of these affairs. Still, I would have liked to have heard what became of John Henry's friend.

That Love of "Cold Shivers"

The dear old British public, it does like to "get that cold feeling," sometimes called "the shivers," doesn't it? I think we inherit it from the time of the first relation to our progenitors of Bluebeard's Chamber of Horrors. Since then we have progressed steadily through Shakespeare's *Hamlet* and *Macbeth* to Grand Guignol and Madame Tussauds, and now "over the ether." Between being "Down in the Coal Mine," "Hunt the Tiger," and now "Congo Night"—well, frankly I prefer "Charley's Aunt." Tom-toms and the wailing of the native war chants from the last straw after you have put up that fight to get a seat in the tube. THERMION.

WELL-KNOWN AMATEUR STATIONS.—I

5 Q V



Mr. F. H. Stollery's Transmitting Station 5 Q V.

STATION 5 Q V is known throughout the length and breadth of Great Britain—at least at all those amateur receiving stations which make any pretence at D.X. reception.

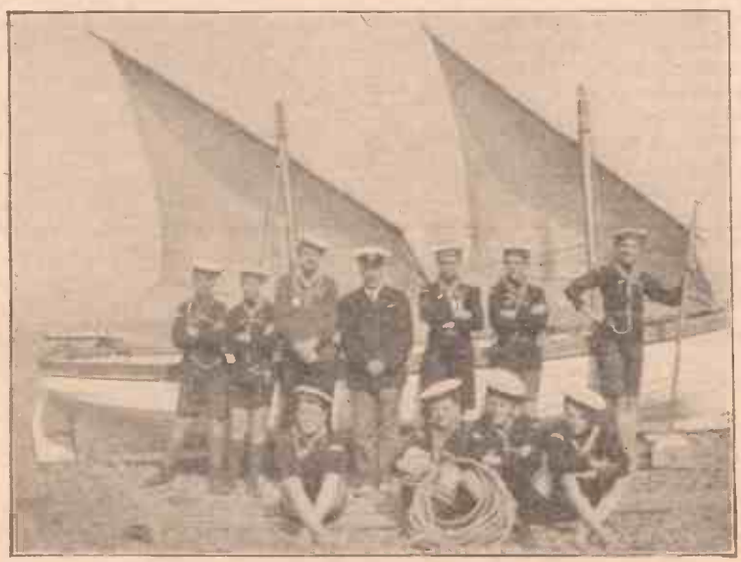
It is owned and operated by Mr. F. H. Stollery (Member R.S.G.B.), and is situated on the East Cliff at Clacton-on-Sea. It serves as a control station of the T. and R. Section and O.R.S. of the A.R.R.L. The aerial of Mr. Stollery was the first amateur aerial in Clacton; it was hooked up to a piece of carborundum at a time when the few possessing aerials for reception were anything from twenty to forty miles distant from each other. Many lasting friendships resulted from those days.

Having investigated the "ether slashing" propensities of spark transmission with the patient help of 2 Q N (Margate), attention was next given to valve transmission, and quite interesting experiments (for those days) were conducted with absorption modulation on 440 metres, two T15 valves in parallel being used, the radiation being .35 ampere with H.T. from the D.C. mains. Later a more vigorous transmitter was installed with one T30 valve as an oscillator, using grid control for telephony. This set gave excellent results on low-power telephony. Next a 2,000-volt D.C. generator with remote control came into commission, and using H.T. from one half of this generator with a counterpoise and tuned earth, speech was put through to Italy on 185 metres at dusk one evening. It was audible there with two valves (one detector, one L.F.). Speech from this set is QSO in daylight in Scotland and Northern Ireland.

The set has now been supplemented with a straight Hartley circuit with a tuned grid circuit and parallel feed. A 50-watt valve is used as an oscillator, radiation being over 6 amperes on 160 metres with full load, using the counterpoise and no earth connection! Signals have been reported by 8 P A (Bouches du Rhone, France) as R8. Two separate aerials are used at present, one a single enamelled wire for reception and an eight-strand cage aerial with a six-strand cage down lead for transmission. The height is approximately 45 ft. All the leads-in from the two aerials and counterpoise pass to heavy earthing switches near the point of entrance. One mast is of galvanised-iron barrel, and the other of fir.

The length of the aerial is 70 ft. overall, and it is somewhat screened by the house on one side though open to the sea on the other. The receiving aerial is directional N.W., and excellent D.X. reception is obtained on this.

The counterpoise has eight strands, arranged slightly fan shape; it extends the length of the aerial at a height of 8 ft. The earth consists of copper wires laid under the cemented path and connected to earth plates at the foot of the farther mast. A 44-ft. roll of fine wire-gauze netting connected to the earth terminal is laid on the surface of the path during speech transmission, as this is found to increase radiation by about .1 ampere. Keying is effected in the grid, as with the voltage used no risks must be run of a "hug" from the high tension. Speech control is effected on the set by means of a valve of high impedance, such as an M.O. R5v.



Mr. Stollery (Centre) Takes an Active Interest in the Sea Scouts.

Three separate receiving sets are available, any of which can be switched in with a loud-speaker and micro-amplifier for boosting up phone reception. The receivers comprise a crystal set for Chelmsford, a two-valve Reinartz (80 to 500 metres) for experimental reception, and an old three-valve Marconi panel for 26,000 metres. The efficiency test for this last antiquity is the weekly recording on Sunday mornings (09.55 to 10.00 G.M.T.) of the time signals from N B A, Panama (about 6,000 miles).

5 Q V has been described as the "star of the East," and judging by the number of callers during the summer months it must be at least as attractive to the "brass pounders" as is the ozone of Clacton. When the visitor enters the station he is at once struck by the tidy and neat appearance of the apparatus. The careful attention that has been given to every

(*Concluded in third column of next page*)

USING THE THOUSAND-CIRCUIT BOARD

The first of two articles detailing the many uses of the experimental receiver described in the seven preceding issues.

THOSE who make up the set will find that it is the easiest thing to use because its general lines are so very much like those of a wiring diagram and because so few connections have to be made even when wiring up a big set. Examination of the diagram below will show all that has to be done when turning the board into a five-valve set with double-circuit tuner, two stages of high-frequency amplification, tuned-anode coupled, a rectifier and two stages of low-frequency amplification, both extra high-tension potential and grid bias being used for each of the last two valves.

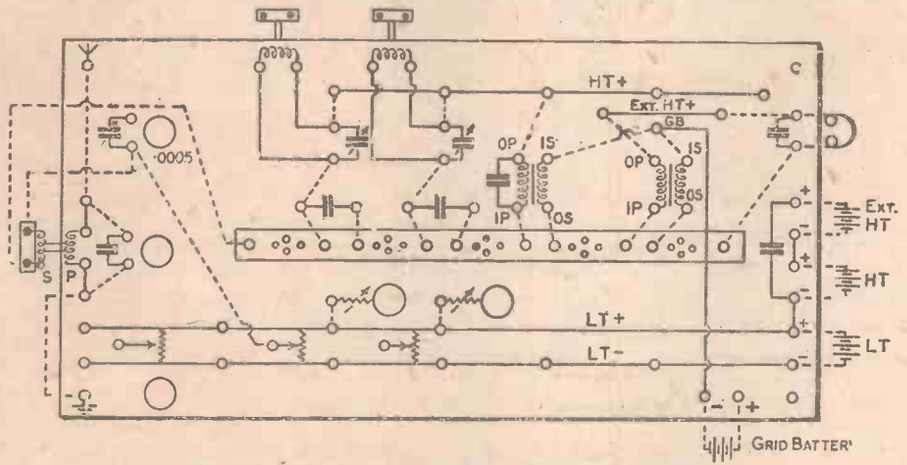


Diagram showing the Board as a Five-valve Receiver.

The permanent wiring of the board, exclusive of the filament connections, is shown in thick lines, whilst the connections that have to be made are shown by broken lines. It will be seen that there are only twenty-eight of them all told.

Quick Work

To alter this set by, say, doing away with the secondary circuit and using reaction coupled to the second tuned-anode inductance is the work of a few moments. The secondary coil of the tuner is disconnected from the .0005-microfarad variable condenser, the latter being also disconnected from the grid of the first valve and from the potentiometer. A lead is run from the upper terminal of the primary of the tuner to the grid of the first valve and from the lower terminal to the potentiometer. Next the wire between the plate of the rectifying valve and IP of the first transformer is removed and wires are taken from the plate of the rectifier and from IP of the first transformer to the terminals of the moving-coil holder opposite the second H.F. valve. This coil holder is also connected to the .0005-microfarad variable condenser, and this completes the change.

Suppose, again, that after using the circuit shown in the drawing for short-wave work we desire to receive say the Eiffel Tower on 2,600 metres. The best thing to use here is resistance-capacity H.F. coupling. The changes needed are very few indeed. Remove the inductances from the holders opposite valves 1 and 2, replacing them with plug-in anode resistances, the making of which has already been described. Turn both the anode condensers to zero and the set is ready as soon as a larger A.T.I. and secondary have been placed in the coil holders of the tuner.

Let us take another case. We will suppose that we find two tuned-anodes rather difficult to handle and that we decide to try instead tuned-transformer high-frequency coupling. We remove the two anode inductances and disconnect the first grid condenser and grid leak. Remove also the connection between H.T. plus and the tuned circuits. Above valve No. 1 we place the transformer holder, connecting IP to plate and OP to H.T. positive; IS we connect to grid and to the upper terminal of the first .0003-microfarad variable condenser. The lower terminal of this condenser we connect to potentiometer and OS. The wiring between the second and third valves is precisely the same, except that as No. 3 is the rectifier we leave the grid condenser and grid leak in place, connecting one of the former to the upper terminal of the second .0003-microfarad variable condenser.

L.F. Amplification

Of low-frequency amplification we can use either one or two stages or none at all at will. If none is required, switch off the L.F. valves, disconnect the extra H.T. battery and short-circuit the terminals. Disconnect the grid of the rectifier from IP of the first transformer and join it to the lower telephone terminal. That is all. Should it be desired to use extra high-tension voltage only for the last valve when two L.F. stages are in use, then OP of the second low-frequency transformer comes to H.T. plus instead of to extra H.T. plus, and IS of the first transformer is taken to L.T. minus instead of to the grid-battery terminal.

Aperiodic Transformers

Aperiodic H.F. transformers are connected in the same way as those which are tuned, except that the .0003-microfarad variable condensers are omitted from their secondary circuits. It will usually be found that if two stages of sharply-tuned H.F. coupling are used it is not necessary to use a double-circuit tuner in order to obtain perfect selectivity; in fact it is actually inadvisable to do so, for the set is much more liable to oscillate with the loosely-coupled tuner.

Loose-coupled Transformers

For broadcast and other medium-wave reception I am rather inclined to recommend yet another form of tuned H.F. transformer coupling, which can be made up with the greatest ease on this board. This is the *loose-coupled* H.F. transformer. For this pairs of inductances of suitable values are mounted in the two double-coil holders above valves 1 and 2. These are wired up exactly like tuned transformers, the moving coil being the primary in each case and the fixed coil, tuned by a .0003-microfarad variable condenser, the secondary. With this type of intervalve loose-coupling great selectivity is obtainable and there is very little tendency on the part of the set to fall into self-oscillation.

J. H. R.

(To be continued)

"WELL-KNOWN AMATEUR STATIONS" *(continued from preceding page)*

detail of the outlay and arrangement of the gear is apparent in the photograph, 5 Q V is mindful of the very helpful assistance rendered by 2 L Z, 2 M C, 2 M D, 2 T O, 6 B T and others who send so many useful reports.

The decorations on the wall of the den are a great economy of wallpaper and testify to 5 Q V being QSO in seven European countries.

A. J. C.

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DUBILIER.

.001, .002, .003, .004, .005, .006. Fixed	3/-
.0001, 0002, .0003, .0004, .0005	2/6
Type 577, .01	7/6
Grid Leaks each	2/6

Anode Resistance 50,000, 70,000, 80,000 100,000, on stand complete 5/6

IGRANIC.

Coils: 25, 5/-; 35, 5/-; 50, 5/2; 75, 5/6; 100, 7/-; 150, 7/10; 200, 8/8; 250, 9/-; 300, 9/5; 400, 10/3; 500, 10/6

Fil. Rheostat	4/6
Potentiometer	7/-
30-ohm Rheostat	7/-

TRANSFORMERS

Radio Instruments	25/-
Igranic, Shrouded	21/-
Powquip, Shrouded	18/-
Formo, Shrouded	18/-
General Radio 83	14/11
Brunet, Shrouded	13/6
Formo, Open	12/6
Powquip, 2-1 or 4-1	14/6
Raymond	10/-
Eureka Concert Grand	30/-
Ditto, 2nd Stage	22/6
Silvertown	21/-

FIBRE STRIP for COILS

1 in. wide, 12 ft., 1/-.

LISSEN.

Variable Grid Leak	2/6
Anode Resistance	2/6
Lissen Minor	3/6
Lissenstat	7/6
Do. Universal	10/6
2-Way Switch	2/9
Series Parallel	3/9
T1 Transformers	30/-
T2. 25/-; T3. 16/6; Coils: 25, 4/10, 30, 35, 40, 4/10; 50, 5/-; 60, 5/4; 75, 5/4; 100, 6/9	

RHEOSTATS.

Ormond	2/-
Raymond	1/6
Do. with dial	2/-
Extra value do.	2/6
T.C.B. 6 ohms	4/-
Potentiometer T.C.B.	5/-
Burndept Dual	7/6

TRANSFORMERS (H.F.) Post 3d.

McMichael, 300/600	10/-
Ditto 1100/2000	10/-
Energo, 250/700	3/11
Ditto 900/2000	4/6
Raymond, 300/800	2/9

Others Stocked.

POLAR Post 6d.

.001 var. Condenser	10/6
.0005 " "	10/6
.0003 " "	10/6
Micrometer Condenser	5/6
Cam Vernier 2-way Coil Holder	11/-

VALVES

THORPE K4	17/6
5 PIN PHILLIPS 4 ELECTRODE (Both for UNIDYNE)	12/6

MYERS VALVES

Universal	12/6
D.E.	21/-

BRIGHT EMITTER 12/6 each.

B.T.H.	R. Type
Ediswan	A.R. "
Marconi-Osram R or R 5 V	"
Mullard-Ora	"
Cossar P.1	"
Cossar P.2	"
Myers-Universal Xtraudion	
Mullard H.F. (Red Ring)	
Mullard L.F. (Green Ring)	

DULL EMITTER 21/- each

B.T.H.	B.3
Ediswan	A.R.D.E.
Marconi-Osram	D.E.R.

All Valves on post sent at Purchaser's risk.

25/- each

B.T.H.	B.5
Ediswan	A.R.O.6
Marconi-Osram	D.E.3
Mullard	D.F.Ora

DULL EMITTER POWER VALVES

For use with A.R.D.E. and D.E.R. Valves

Marconi-Osram, Type D.E.6.2	2.5 volt, .25 amps. 25/-

DULL EMITTER POWER VALVES

For use with .06 Valves.

B.T.H. Type B.6	35/-
Marconi-Osram Type D.E.4	30/-
Mullard Type D.F.A.2	30/-

DULL EMITTER POWER VALVES

For use with bright Emitters

B.T.H.	B.4	35/-
Marconi-Osram	D.E.5	35/-
Mullard	D.F.A.1	35/-

"J.B." VARIABLE CONDENSERS

SQUARE LAW

.001	- 9/6	.00025	- 6/9
.00075	- 9/-	.0002	- 5/6
.0005	- 8/-	.0001	- 5/3
.0003	- 6/9	Vernier	4/6

"J.B." ordinary type Standard Super Micro-denser

.001	- 8/6	- 9/6	- 11/6
.00075	- 8/-	- 9/-	- 11/-
.0005	- 7/-	- 8/-	- 10/-
.0003	- 5/9	- 6/9	- 8/9
.00025	- 5/9	- 6/9	- 8/9
.0002	- 5/-	- 5/6	- 8/-
.0001	- 4/9	- 5/3	- 7/9
Vernier	4/-	- 4/6	-

RIGHT OPPOSITE DALY'S GALLERY DOOR

K. RAYMOND

WIRELESS DEPOT

27, LISLE STREET, W.C.2

'PHONE: GERRARD 4637

HOURS OF BUSINESS:
DAILY - - 9 to 7.45
SUNDAYS - 10 to 1

No responsibility accepted on post orders unless cheques and postal orders are crossed and made payable to the firm. Monies sent must be registered

HULLO EVERYBODY!!

Please NOTE. ALL Orders accepted on condition that same will be despatched at earliest possible moment but cannot be cancelled through non-delivery by manufacturers. Right reserved to return cash.

ALL FOREIGN ORDERS MUST INCLUDE AMPLE EXTRA POSTAGE

RAYMOND'S VARIABLE CONDENSERS

ALL OUR CONDENSERS HAVE BEEN TESTED AND RECOMMENDED BY LEADING JOURNALS—UNSOLICITED.

—Exclusive design.
—Stout vanes.
—Extra insulation, very compact.
—Narrowest spacers (pressed aluminium).
—Centre rod cannot bend.
—Terminal connections capacity guaranteed.
—Perfect efficiency.
—Handsome design.
—Takes up very little space in panel.
—Nickelled fittings.
—Beautifully made.
—New one-hole fixing method.
—Wonderful for portables.

UNSURPASSED FOR FINE TUNING.

Costs a trifle more, a few pence only, and is just what you want. Nice dial and knob included.

'DE LUXE' MODEL

AS SHOWN, WITH DIAL, KNOB AND BUSH.

.001	7/3
.0005	5/11
.0003	5/4
.0002	4/11

POST 6d. SET.

John Blair, Esq., Rexall Pharmacy, Millom. says: Your Condensers are a REVELATION to me as a Dealer. Sept., 1924.

C. Walton, Esq., Andover. Tested your Condensers on Megger and got "INFINITY."

TWIN CONDENSER

9/- Post Free

Composed of two equal units of .00025 or .0003 mfd., operated by one Knob and Dial, thereby enabling you to tune two circuits by one turn of the dial. Can be used in series or parallel. Complete as shown with Knob and dial.

NEW MODEL

WITH VERNIER

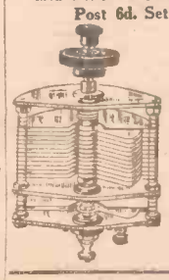
.001	9/3
.0005	7/3
.0003	6/9

WITH EBONITE DIAL and TWO KNOBS. Post 6d. Set.

WITHOUT VERNIER

.001	6/6
.0005	5/3
.0003	4/11
.0002	4/6

Vernier, .00005 3/9
With the knob and dial Post 6d. Set.



SQUARE LAW

.0005	7/9
.0003	6/6

With Vernier.

.0005	10/6
.0003	9/6

Post 6d.
Knob and Dial included.

LOUD SPEAKERS

Sterling "Dinkie"	30/-
Junior Amplion Newest Model	27/6
Junior De Luxe Oak Trumpet	42/-
Baby Sterling Splendid Value	55/-
Dragon Fly, Baby Amplion	25/-

THORPE K4 VALVES

(5-pin) for UNIDYNE 17/6
HORPE K1 10/-
5-Pin Valve-holder 1/6
POST FREE

ACCUMULATORS

MADE BY WELL-KNOWN FIRM FOR ME.

	By	Post
2 v. 40 amps.	9/6.	10/6
4 v. 40 amps.	16/6.	17/6
4 v. 60 amps.	19/6.	20/6
4 v. 80 amps.	23/6.	24/6
6 v. 60 amps.	27/6.	29/-
6 v. 80 amps.	33/-.	34/6
6 v. 105 amps.	38/6.	40/6

Genuine
DR. NESPER HEADPHONES

Adjustable diaphragm detachable receivers, double leather-covered head-springs, long flexible cords, nickel-plated parts. Very comfortably fitting to the head.

LOOK FOR THE TRADE MARK.

4,000 ohms 12/11
Post 6d. pair.

FAMOUS N. & K. Model HEADPHONES

Guaranteed 4,000 ohms.

Guard against inferior articles offered cheaply.

12/11 Post 6d. pair.

CALL AND SEE US AND GET VALUE for MONEY

FRENCH THOMSON HOUSTON

4,000 ohms.

15/11 per pair

SUNDRIES

Callers Only (These 3 Columns)

NO POST ORDERS FROM SAME

Dutch valves .06	12/6
"Metal" " .06	15/11
Phillips " .04	15/11
Dutch Detector	4/9
Dutch Hard	5/-
Metal (French) "R"	6/11
Phillips "R"	7/6
Enclosed Detector Large	
Brass on Nickel	1/3
Ditto terminal end	1/6
Small enclosed	10d.
Burndept Detector	5/-
Set four whiskers (one gold)	2d.
Easi Fix cups 1d. and 1½d.	
Neutron Crystal (fine)	1/6
Hertzite Shaws genuine	1/-
Gold spearpoint whisker	3d.
Special whisker in Tube	6d.
Set of six Spanners	1/4
Taps 0, 2, 4, 6 B.A. set	2/-
Ditto with wrench	2/11
Seven Twist Drills	1/4
5 ohm Rheostat (extra)	1/3
One Hole Fixing	1/3
Ormond	1/9
Ebonite Former	1/6
Ditto and Dial	1/10
Igranic, T.C.B., and all known makes.	

EBONITE, 3/16-in.

CALLERS' PRICES.

6 × 6	1/4
7 × 5	1/4
8 × 6	1/10
9 × 6	2/-
10 × 8	3/-
12 × 6	3/-
12 × 9	4/3
12 × 12	5/6
14 × 10	5/6

CUT TO SIZE, ½d. sq. in.
WE STOCK ¼-in. EBONITE.

SHAW'S HERTZITE

BEATS ALL OTHER "ITES" 1/-

BASKET COILS

Duplex Waxless (5) 1,200/2,000 metres	1/8
Waxless Set of 5 25, 35, 50, 75, 100	1/11
D.C.C. Chelmsford	1/-, 1/3
Enamelled Do.	1/-, 1/2
Waxed (6) 200/3,600	1/8
Ditto (7) 150/3,600	1/10
D.C.C. Coil for Chelmsford complete with adapter (to use with 650 variometer)	2/3

Our Wonderful
H.T. BATTERIES
NO POST ORDERS

60 v.	7/6
30 v.	4/6
60 v. B.B.C.	4/6
36 v. B.B.C.	5 6
9 v. B.B.C.	2 6

Good Coil Plugs from	4½d.
Edison Bell Shaped	1/-
Raymond ditto	10½d.
Basket Adapters Also at 1/- & 1/3	8½d.
2-Way Coil Stands	2/6
With Extens. Handle Also at 3/6, 4/-, 4/6	2/11
3-Way	4/3, 4/6, 5/-
Goswell Cam Vernier	9/
Franco " "	12/6
Polar " "	11/-
Etc., etc.	
Coil Plug on Stand	1/-
Ditto. Swivel Movement	1/3
Coil Plug and Clips	6½d.
Microstat	2/6
Tumbler Switches (Ebonite)	1/4
Fibre Strip (for Coils) 3 feet	2½d.
D.C.C. Wire, per ¼ lb.— 18 g. 9d. 20 g. 9d. 22 g. 10d. 24 g. 1/- 26 g. 1/1. 28 g. 1/3 30 g. 1/6. Etc., etc.	
Solder per stick	2d.
Shellac	5d.
Nickel Pillar Terminals	2d.
Nickel Contact Studs 2 for	1d.
Nickel Switch Arm (one hole fixing)	1/-
Loading Coil and Plug	8d.
Gamages Permanite	1/-
Condenser Bushes	6d.
Strong Valve Template	4d.
Egg Insulators	1d.
Reel ditto	1d.
Thick Rubber Lead-in per yard	2d., 3d.
Ribbon Aerial 100 ft.	1/10
Panels Drilled	
Radio Press Envelopes	
Raymond Fixed Condensers .001, .0001 to .0005, .002, .003, .004	10d. 1/-
.006 1/3; .01 1/9; .02	1/9
Polar Micrometer Condenser	5/6
W.O. or Pillar Terminals	1d.
Small Pillar 4 for	3½d.
'Phone 4 B.A.	1d.
'Phone 2 B.A. 2 for	2d.
Valve Sockets 4 for (Above with Nut Washer)	3d.
Valve Pins and Nuts, 2 a	1d.
Stop Pins and Nuts 2 a	1d.
Plug and Socket pr.	1d.
Spring Washers 4 a	1d.
Spade Screws	1d.
Pin Screws 2 for	1d.
Spade Tags 5 a	1d.
Spring Pillar Terminals	2½d.
Nuts, 2, 4, 5, 6 B.A. doz.	2d.
Washers (Brass) 12 a	1d.
Porcelain D.P.D.T.	1/7-
Porcelain S.P.D.T.	1/3
Min. Panel D.P.D.T.	1/-
Min. Panel S.P.D.T.	10½d.

VARIOMETERS

Wonderful Value

Special 250/600	1/6
Extra with Clips	2/6
Ebonite	3/9, 4/6, 5/11
About 16 various Designs No Rubbish	

'Phone Cords (6 feet)	1/5
Nugraving	7½d.
Good Knobs	2d. and 3d.
Studs, Nuts and Washers doz.	4½d.
Switch Arms	8d. to 1/-
Copper Foil ft.	2½d.
18g. Sq. Tin Copper 15 feet	5d.
16g. Sq. Tin Copper 12 feet	5d.
Round Tin Copper, various Sizes.	
Insulated Staples	5 a 1d.
Insulated Hooks	4 for 3d
Rubber Lead in, 30 feet	1/3
7/22 Copper Aerial, 100 feet	1/10½
Extra Heavy Aerial 100 ft.	2/- & 2/3
Good Valve Holders	10d.
H.F. Transformers	2/9
Empire Tape, ½ in., 2 yds.	1d.
6 in. Ebonite Anticap Handles	8d.
Connecticut Switches	1/4
1,000 ohm Bobbins	1/3
Sorbo Rubber Ear Caps pr.	1/4
Adhesive Tape Roll	2½d.
Basket Coils	
Waxless ST100 (2)	1/0
Waxless (5) 200/2,000, set	1/8
Waxed (6), 200/3,600 set	1/8
Waxed (7), 150/3,600	1/9
Chelmsford No. 8 Tandeo	1/-, 1/6
Chelmsford, D.C.C.	1/3
1 Complete with Adapter (To use with variometer.)	2/3
Allen var. Gd. Lk.	1/3
Allen Anode Res.	1/3
Dial and Knob (Ed. Bell)	1/3
Dial (Ebonite)	10d.
Brunet Headphones	14/6
Twin Flex 4 yds.	6d.
D.C.C. Bell Wire, 10 yds. (Indiarubber covered)	5d
Sleeving yd.	4d.
Wander Plugs pr.	3d.
Coloured Plugs each (All screw pattern)	1½d.
Electron Aerial	1/3½
Polished Boxes, 8 by 6	3/6
Lissen Choke	10/-
Do. Aux. Res.	1/3
5-point Switch	4/-
Legless Valve Holders	10d.
Soldering Irons	6½d., 9d.

RIGHT OPPOSITE
DALY'S
GALLERY DOOR

K. RAYMOND

WIRELESS DEPOT
27, LISLE STREET, W.C.2
'PHONE: GERRARD 4637

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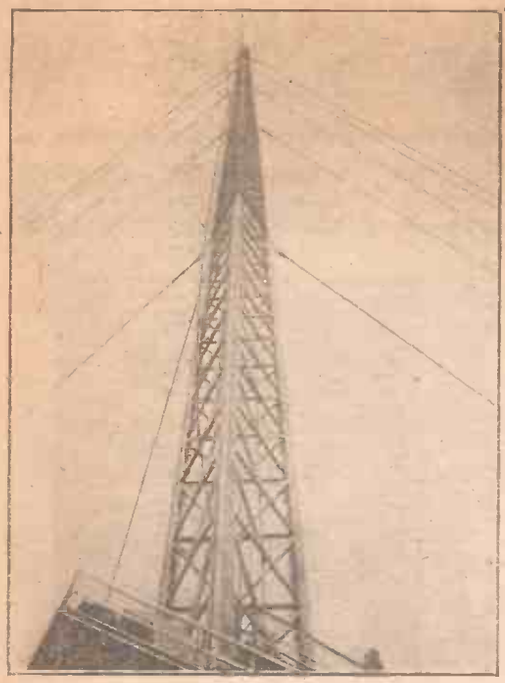
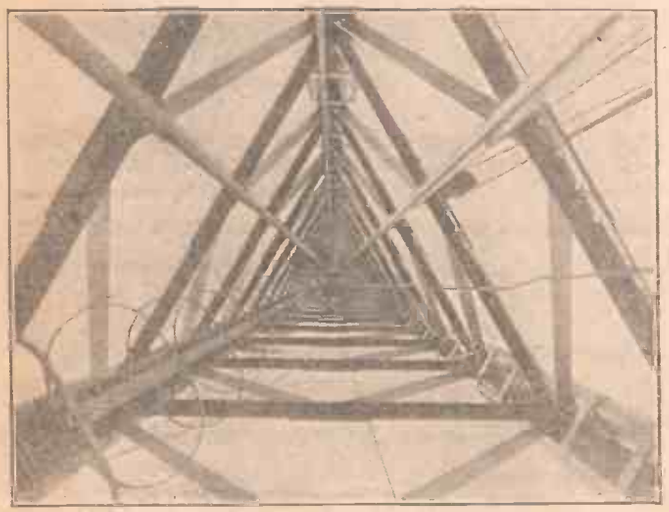
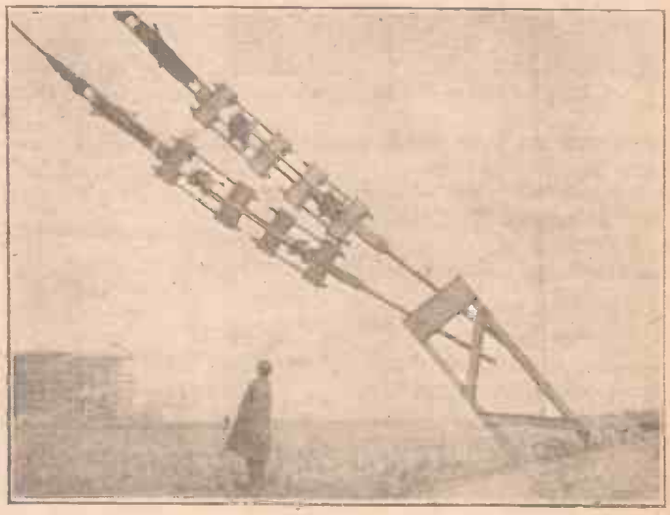
HOURS OF BUSINESS:
DAILY - - 9 to 7.45
SUNDAYS - 10 to 1



THE LARGEST WIRELESS STATION IN THE WORLD

AT Hillmorton, near Rugby, the most powerful wireless station in the world is now being erected. There are eight giant masts for the aerial, covering 800 acres, and each mast is 820 ft. high, or nearly six times as high as Nelson's column. The masts are triangular and each weighs 200 tons. The pictures in their order show respectively: One of the masts nearing completion, a view looking up one of the steel standards, a view looking up one of the masts and two of the insulated stays.





COLLOID RECTIFIERS

PROGRESS has recently been made in the direction of using colloidal substances as a substitute for the thermionic valve. Colloids are jelly-like substances of large molecular mass. They are in the nature of, but are not, true solutions. In one type of colloid the liquid molecules are absorbed by the solid molecules. In the other type the solid molecules are held in a peculiar state of suspension throughout the liquid. Microscopic examination of the latter variety reveals a peculiar agitation taking place amongst the suspended particles. This is known as the "Brownian movement," and is due to unbalanced electronic charges. Under the influence of an applied E.M.F. these intermittent movements can be converted into a one way electron flow similar to that existing between the filament and plate of a valve. D. H.

TESTING H.T. BATTERIES

HIGH-TENSION batteries should preferably be tested cell by cell with a small-reading voltmeter after the battery has been in use for some time. This method will indicate a dead cell if one is present. Any cell giving a reading of less than one volt comes under this category. The test should not be made after the H.T. battery has been off load for some time, as the polarised cell then has time to recuperate and will probably show a residual E.M.F. of more than one volt. Dead cells offer a very high resistance and should be promptly shorted. In addition they are a frequent source of "noise" or crackle in the set owing to irregular fluctuations in the effective E.M.F. due to the effects of progressive polarisation. M. A. L.

PLACING THE PHONES

IN an ordinary crystal set the phones should always be inserted in the circuit on the "earth" side of the crystal, otherwise they open up a leakage path across the crystal through the body of the listener to earth. Unrectified H.F. currents passed in this way represent so much lost energy. In a single-valve circuit the proper place for the phones is on the negative side of the H.T. battery. If they are inserted between the H.T. positive and the plate, they are at a high positive potential and may be the cause of leakage to earth. This applies particularly when the set is wired up to phones in different rooms.

In the case of multi-valve sets, the telephones are generally inserted on the H.T. positive side owing to the fact that all the valves are fed from the same battery, and any other arrangement consequently becomes impracticable. A. M.

AROUND THE SHOWROOMS

Shipton Resistance

BY making the fuse an integral part of their new strip filament resistance, E. Shipton and Co., Ltd., have accomplished something that should be appreciated by all amateurs who use valves.

Shipton Filament Resistance.

At present too little use is made of such protective devices.

A spare fuse is included in each carton, the whole costing only 3s. for a filament resistance of 7, 30 or 60 ohms. The address is 37, Tothill Street, Westminster,

Vernier Condenser

FOR some time there has been felt the need for a small vernier condenser that can be fitted to a panel without taking up a lot of valuable space. That such a compact condenser exists is evidenced by the photograph, which shows a Trix vernier condenser.

Trix Condenser.

Faraday House reports that the maxi- and minimum values of this are respectively .0001 and .0000245 microfarad. Trix products are made by Eric J. Lever, of 33, Clerkenwell Green, E.C.1. The vernier condensers are sold at 3s. 6d. each.

"Book of MOV"

TADPOLES and frogs and fairies seem to have little connection with the technicalities of wireless, but in "The Book of MOV" they are used in an interesting analogy of the working of the valve.

A copy of this 40-page book, which contains useful data concerning Marconi-Osram valves, as well as an interesting analogy on the working of the valve for the non-technical reader, can be obtained post free from the M.O. Valve Co., Ltd., of Brook Green, W.6, if AMATEUR WIRELESS is mentioned.

H.F. Xtraudion

IT is well known that the Xtraudion valve functions best as a low-frequency amplifier, and in order to meet the demands of those who want efficient high-frequency amplification a special H.F. Xtraudion is now being made.

This takes slightly more filament current than an ordinary Xtraudion (.5 ampere) and works with an anode voltage of between 30 and 80 volts. The price is 12s. 6d.

Original Valve Holder

WHEN building sets on the American principle—that is, with a vertical panel and with the valves enclosed—it has been necessary up to the present to build shelves on which to mount the valve holders. This difficulty is overcome by an original type of valve holder, one of which is shown by the photograph.

It will be seen that the holder can be easily fixed to a vertical panel and a window provided for inspecting the brightness (or otherwise!) of the filament. These holders are made by V. R. Pleasance, of 60, Fargate, Sheffield. VANGUARD.

Panel-mounting Valve Holder.

PROGRESS AND INVENTION

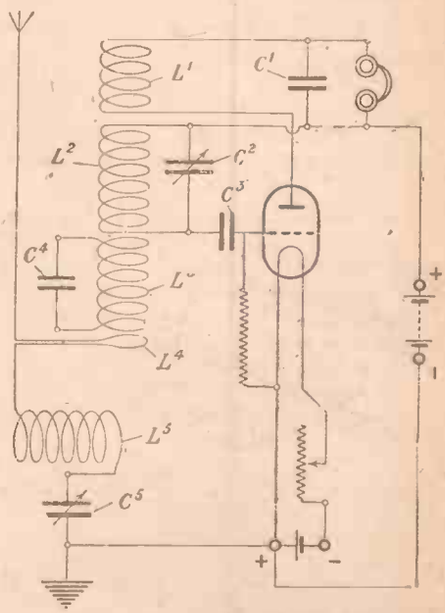
Single-valve Circuit

THAT it results in the maximum clarity and tone in reception with the minimum number of valves and is free from the complexity of couplings usually used in arrangements of a compound type is the claim made for a new circuit that is the subject of Patent No. 221,951/24 (Cooke and Whitfield Wireless, Ltd., and H. H. Whitfield, both of Birmingham).

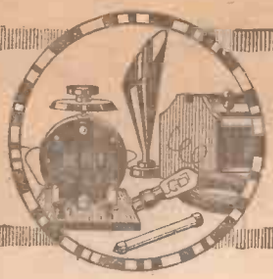
In the aerial circuit is included a single-turn coil L4 (see circuit diagram) which is wound about the lower end of a periodic coil L3. The aerial tuning coil L5 is placed with its plane at right angles to the plane of the coil L3. Coil L3 is wound on the same former and side by side with L2, these being spaced apart. Coil L3 is not tuned to the incoming wavelength.

Wire of relatively large gauge and hence of low resistance is used for winding coils L4, L3 and L5, but fine wire can be used for the reaction coil L1. This is wound over the top of L2, but is insulated from the latter. The whole circuit is shunted by a relatively large capacity C1.

The periodic coil L3 is inserted for the purpose of obtaining oscillation in the oscillatory circuit and to compensate for the phase difference between the currents in the aerial and subsidiary circuits. It is found that with a circuit constructed in this way, with the use of one valve, excellent results are obtained.



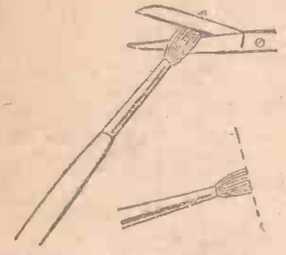
Single-valve Circuit (221,951/24).



PRACTICAL ODDS AND ENDS

Cleaning Crystals

BLOWING on a crystal detector to remove particles of dust, etc., should never be resorted to, as oxidisation of the catwhisker and surface of the crystal is facilitated by so doing.



Brush for Cleaning Crystals.

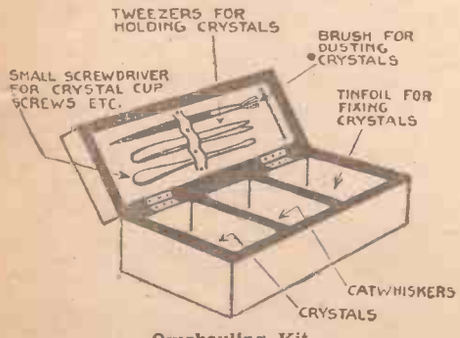
An ordinary painting brush, such as can be obtained for a few pence, can be made into a good crystal-cleaning brush by cutting off the pointed end (as shown in the illustration), a pair of domestic scissors being used for the purpose. R. N. W.

Terminal Tags

BRASS and copper tags soon tarnish and then offer a greater resistance to current passing. If they are "tinned" over with solder, the act of tightening down terminal nuts on tags, removing a minute shaving of solder, will always give a clean and good contact. C. W.

Overhauling Kit

EVERY set needs overhauling at some time or another, and the illustration shows a handy crystal-maintenance kit which is contained in a small gramophone needle-box. A brush, tweezers and small



Overhauling Kit.

screwdriver are held by a strip of cloth fixed in the lid in tool-roll fashion, while spare crystals, catwhiskers and tinfoil or Wood's metal are placed in the compartments. W. N.

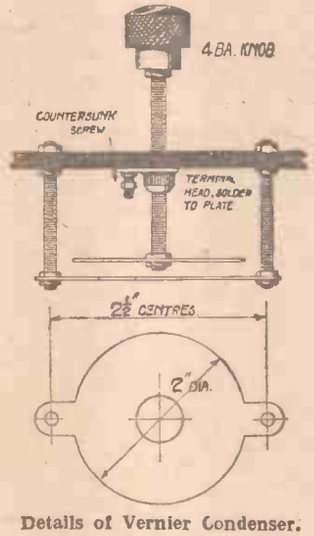
Loud-speaker Distortion

A GREAT number of home-made loud-speakers suffer from the fault of distortion caused by the resonance of the horn used. In the case of papier-mâché horns this distortion is practically non-existent, but with the tin or copper horns the fault is very apparent, particularly in the reproduction of a piano selection.

This can be remedied by painting the inside of the horn with ordinary black enamel or a lacquer and pouring down the horn a quantity of powdered cork over the enamel, which will stick to the metal quite firmly as the enamel dries. This, it will be found, will completely deaden "the tinny effect." A. H.

Vernier Condenser

AN easily constructed and efficient vernier condenser is often a necessity, and can be made to the following details: The sketch shows the method of assembly, with suggested sizes. The plates



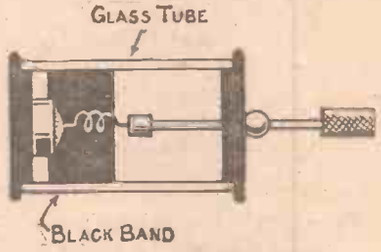
Details of Vernier Condenser.

should preferably be of zinc, though aluminium, copper or brass will serve equally well. One must be circular, while the other should have lugs, as is shown in the lower sketch.

4 B.A. studding is used, and the guide for the moving spindle may be a terminal head soldered to a brass plate. A 5 B.A. screw holds this plate in position, serving also as a terminal for the moving vane. The holes through the panel must be clear. H. W.

Crystal-detector Tip

TO facilitate a quick and visible adjustment of the catwhisker in a glass-enclosed detector, the following hint may be useful. Under the catwhisker and on the inside of the glass tube paint with



Making the Catwhisker Visible.

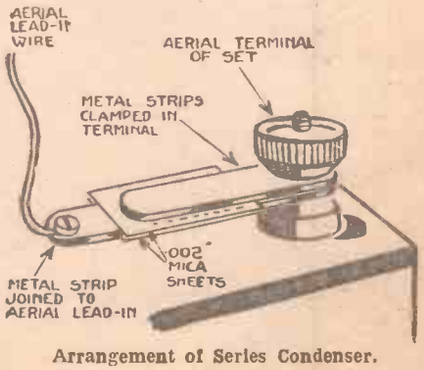
indian ink a band on half of the tube or gum on a piece of black passé-partout paper. This will make the catwhisker more visible owing to the contrasting colours of the catwhisker and black band. P. B. O.

Simple Series Condenser

AN increase in signal strength can, in the case of many crystal sets, be obtained by connecting a small series condenser in the aerial lead. The illustration shows a very simple method of introducing such a condenser.

Two metal strips about ¾ in. wide by 2 in. long are drilled at one end and held by the aerial terminal of the set as shown, a washer of approximately the same thickness as the strip metal being placed between the strips.

A third strip of similar size to the first two, and also with a hole in one end,



Arrangement of Series Condenser.

is then pushed in between the clamped strips with a sheet of .002-in. mica on each side in order to prevent electrical contact. Connection between the aerial lead-in wire and the third strip is then made. N. R.

THE COMMUNAL AERIAL

Two Receive

A SYSTEM that permits of the operation of more than one receiver upon the one aerial has been in practical use for a considerable time, but very few details have been available for the amateur. No claim is made, therefore, in the following description of the system of any novelty. Practically speaking, the efficiency of the system depends upon correct tuning, and as it is almost impossible to emphasise this point too strongly, a resumé of the principles of aerial tuning will not be out of place.

Aerial Tuning

The natural wavelength of a standard P.M.G. aerial hardly ever exceeds about 130 metres. In order to receive present-day telephony additional apparatus in the form of inductances and condensers are employed to load-up or tune the aerial system. Fig. 1 is a theoretical diagram of an aerial system joined directly to earth. In effect the aerial and earth form the two plates of a condenser. The inductance NL is the natural inductance of the aerial wires. Fig. 2 illustrates the same aerial but with an artificial inductance and capacity added in parallel. It will be seen that the introduction of these components has given the aerial system an additional circuit.

Omitting for the present the subject of loose-coupled circuits, it will be realised that for the best results circuit AC-A-L must be tuned to the wavelength of the desired signal. Now if we are tuning for the broadcast concerts, the natural wavelength of the aerial itself NC-NL will be much lower than that of the desired signal. The only practical method of correcting the tuning of the aerial is to add an adjustable aerial-tuning loading inductance as shown in Fig. 3. This inductance is invariably omitted in amateur receivers, with a consequent loss in efficiency and general damping of the whole aerial tuning system.

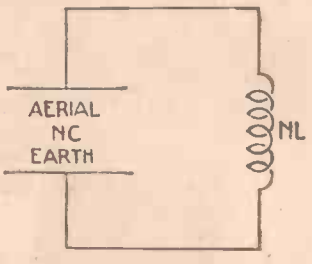


Fig. 1.—Circuit of Plain Aerial.

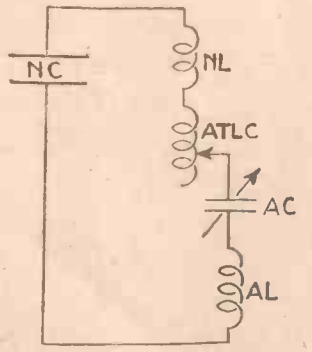


Fig. 4.—Alternative Circuit for Correct Tuning of Aerial.

A Simple Arrangement

Fig. 3 illustrates what may be termed the simplest arrangement permitting of correct aerial tuning. Fig. 4 shows an alternative circuit with the "artificial" condenser in series (instead of in parallel) with the coil. The circuit with the series condenser is called an "acceptor," whilst that with the parallel condenser is known as a "rejector" circuit.

Each circuit has its individual duty to perform, a matter which does not at present greatly concern us. It should be realised that, provided each individual circuit is correctly tuned, any number of circuits may be added to an existing aerial system with very little detriment. Fig. 5 (see p. 790) shows this clearly. If A, B and C have equal values, then the combined value or wavelength is equal to any one of the individual circuit values. A simple illustration will prove the accuracy of this statement. Condensers joined in series give a total capacity equal to

$$\frac{1}{C} = \frac{1}{C_1} \quad \frac{1}{C_2} + \frac{1}{C_3}, \text{ etc.; or}$$

where only two condensers are concerned, $C = \frac{C_1 \times C_2}{C_1 + C_2}$

Condensers wired in parallel give a total capacity of $C_1 + C_2$, etc. Inductances in series gives a total inductance equal to $L_1 + L_2$, whilst in-

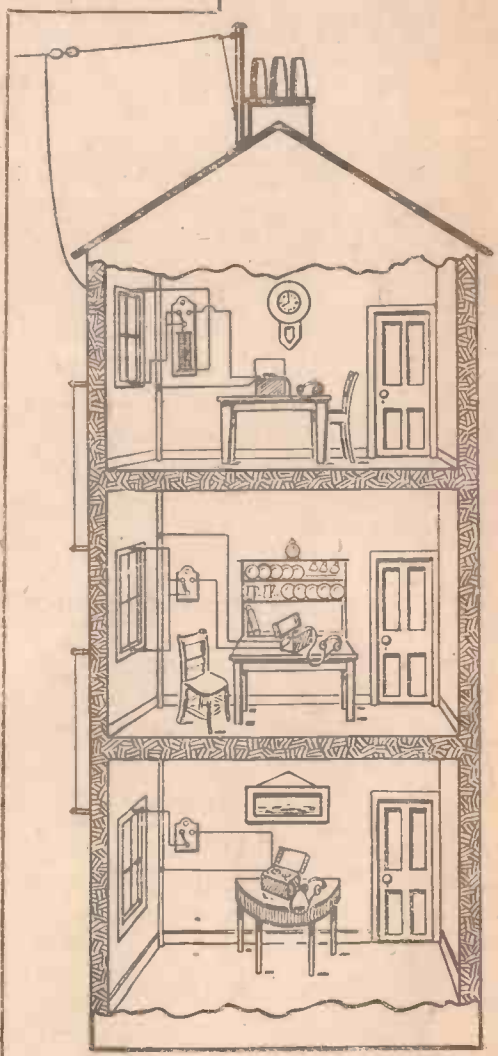
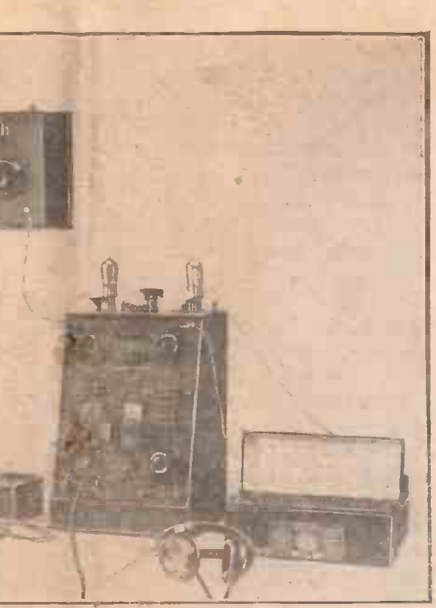


Fig. 6.—House Wired for Three Sets on One Aerial.

Many persons are limited in their wireless activities on account of the difficulty of erecting a suitable aerial. Particularly is this the case with those who dwell in flats, and it is to them that the idea of the communal aerial will make a special appeal. The system described in this article has been in use in the Navy for some time, but it should be understood that as outlined below it is only a suggestion for a novel field of experiment.



rs in Use on the Same Aerial.

ductances in parallel equal $\frac{1}{L} = \frac{1}{L_1} + \frac{1}{L_2} + \frac{1}{L_3}$.

Referring to Fig. 5, the condenser and inductance values of each circuit are represented by round figures, the value of each circuit being 6 LC. Condensers B and C are joined in parallel with each other, consequently the combined capacity equals 2 + 1 = 3. Now this combined capacity B and C is joined in series with condenser A so that the total capacity of the whole system equals $\frac{3 \times 3}{3 + 3} = \frac{9}{6} = 1.5$ units.

There are also two inductances B and C in parallel, and the combined inductance is equal to $\frac{1}{L} = \frac{1}{3} + \frac{1}{6} = \frac{1}{2}$; therefore L = 2.

In addition to this, the inductances B and C are wired in series with A, so that the total inductance of the whole system is 2 + 2 = 4.

Total L = 4

Total C = 1.5

Total LC = 4 × 1.5 = 6 LC

It is hoped that this simple explanation will dispel any doubts which may have been felt concerning the effect of adding many tuned circuits to one system. Provided that all circuits are tuned to receive the one wavelength, no serious losses will be experienced in any one of the circuits. Obviously the introduction of more tuners results in an increase of H.F. resistance, but this is not of great consequence. The obvious remedy is to design all tuners so that they have the least possible resistance to H.F. currents.

Systematic Tuning

Figs. 6, 6a and 7 illustrate alternative methods of using multiple reception in a three-storey house. The circuit shown by Fig. 7 will permit greater selectivity of reception than will that shown by Fig. 6a, but the former will probably cause a slight loss in signal strength due to increased H.F. resistance.

It must be remembered that when once the individual receivers are tuned, any alteration in the tuning of one will affect the tuning of the others. Users of the system should therefore remember the correct setting or adjustments of their particular tuners and not readjust them during a transmission or chaos will result. The sets must be tuned in order, the adjustments being kept fixed when once found.

Set No. 1 should be tuned whilst 2 and 3 are switched off at A and B. Set No. 1 may then be left on or switched off as required and set No. 2 switched on and tuned. Finally No. 3 may be tuned.

After the tuning is completed it will be found that on switching off any one set no effect will be apparent in the phones of the other receivers. In order to ensure uniformity of earth connections, a common connection or water-pipe should be used.

One point of great importance which has not yet been dealt with is the earthing of the aerial system in case of lightning. This may be accomplished (see Fig. 8) by inserting an earthing switch between the aerial lead-in and aerial-loading tuner at C, Fig. 6a, or, on the other hand, shunting between aerial and earth a coil of high resistance and inductance and a micrometer

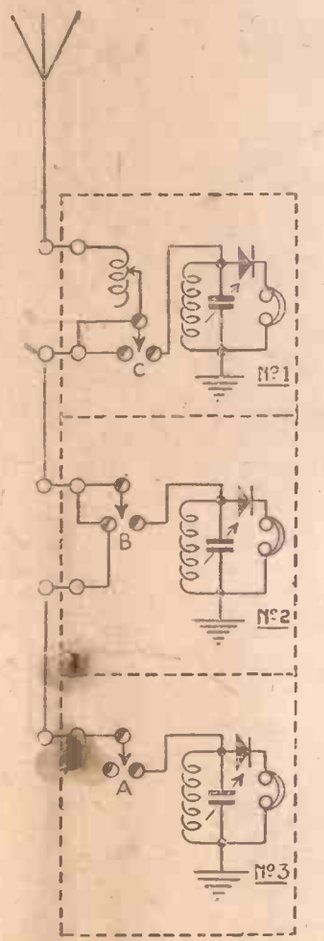


Fig. 6a.—Circuit Diagram of Arrangement Shown by Fig. 6.

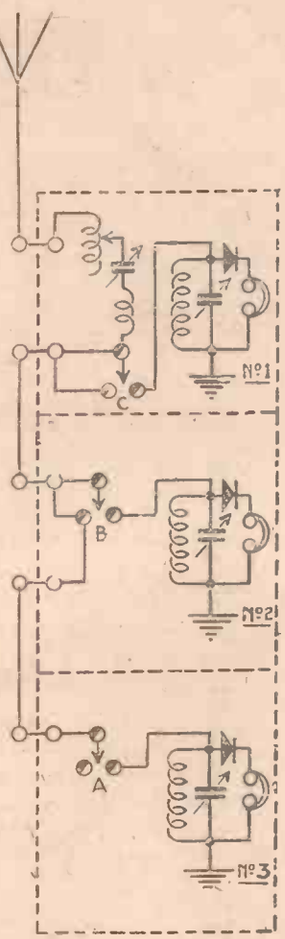


Fig. 7—Arrangement of Additional Acceptor Circuit.

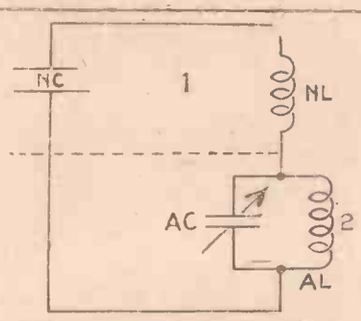


Fig. 2.—Artificial Tuner Added to Plain Aerial.

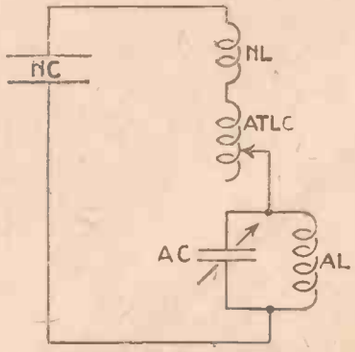


Fig. 3.—Diagram showing Method of Correctly Tuning the Aerial.

spark gap SG (Fig. 8). The resistance coil is an "aerial discharge coil." It permits static charges to leak away to earth, whilst its high impedance blocks the passage of tuned H.F. currents.

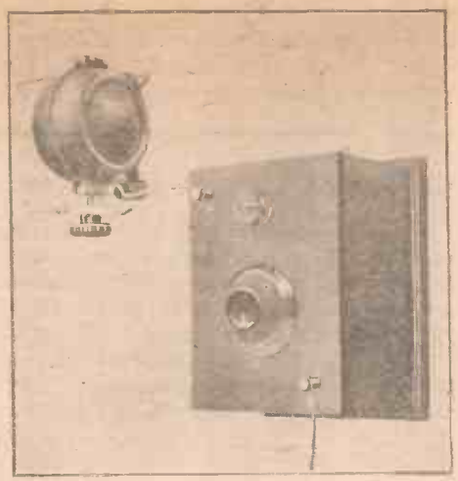
Broadcast Reception

For ordinary broadcast reception the aerial-tuning loading coil may consist of 80 turns of No. 18 enamelled copper wire wound on a cardboard tube which is 3 in. in diameter and 5 in. long. A bar and sliding contact may be fitted in the usual manner, or the coil may be tapped in tens and units for fine tuning purposes.

So far the system has only been considered in connection with crystal sets, but it may be similarly employed with valve receivers. In this case direct-coupled aerial reaction must not be used, even though loose-coupled aerial tuners with plug-in coils be employed.

If reaction is used it should be taken to the H.F. valve coupling, and in addition to this loose-coupled aerial tuning should be employed. In order to avoid too complicated a circuit it is best to confine oneself to a system where two receivers only are used. It should be borne in mind, however, that the restrictions and rules governing these two sets hold good for every receiver or circuit which may be added. Fig. 9 illustrates the arrangement for coupling two separate receivers to one aerial. It will be seen that the primary circuit in each case has now been converted into an acceptor, whilst the secondary forms a rejector circuit.

Assuming that the natural capacity of the aerial is 2, the aerial loading coil C in Fig. 10 must have a value of 3 in order to make the aerial tune to 6 LC. The remaining values for circuit A are



View of Aerial and Acceptor Tuners.

then adjusted as required. Turning to circuit B, it will be seen that the original aerial system cannot be tuned to 14 LC without some addition. This is because capacity 2 and inductance 3 equal 6 LC. However, there is a simple remedy. By inserting an additional aerial tuning inductance (shown dotted) having a value of 4, the aerial itself is tuned to 14 LC for circuit B. Proof of this may be had by adding inductance 4 to inductance 3 and multiplying by capacity 2. Result, 14 LC. It is only necessary to include the correct inductance and condenser values throughout circuit B in order to ensure correct tuning.

In actual practice a switch may be inserted at X in order to allow of cutting out in turn each circuit to tune the other. After once having tuned each receiver on the one aerial, further adjustments when listening-in should not be attempted.

Altering Tuning

If the operator of one set makes a practice of going the round of the various stations during the course of an evening, it will be advisable for him to provide himself with a list of adjustments for the different stations. Such a list will facilitate quick retuning and obviate much trouble. As soon as the desired station is tuned-in the operators of the other sets will again hear their own particular stations, but whilst the first operator is altering his tuning the "stay-at-home" operators will probably have their reception cut off or badly jammed. Should reception fail owing to an alteration in tuning on one of the other receivers, the listener should wait until the alteration has been effected, when signals previously received should again be heard; a slight drop in signal strength may be noticed, but by altering the adjustment of one or more of the tuning condensers about one degree signals should again be heard at normal strength.

Value of Components

Nothing has been said with regard to the actual sizes of the coils and condensers for the reception of different wavelengths, as many of the more advanced experimenters can ascertain the values by calculation. Also manufacturers of plug-in tuning coils issue tables denoting the true inductance in microhenries and the wavelength range when used with condensers of certain capacities.

Much experimenting will be required before the system can be expected to give entire satisfaction, and readers must not be disappointed should results be poor at first.

L. A. CHAPMAN.

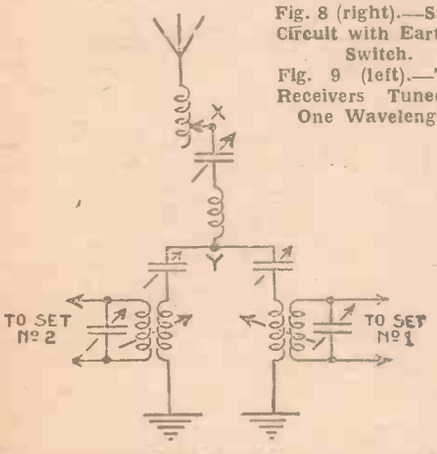


Fig. 8 (right).—Safety Circuit with Earthing Switch.
Fig. 9 (left).—Two Receivers Tuned to One Wavelength.

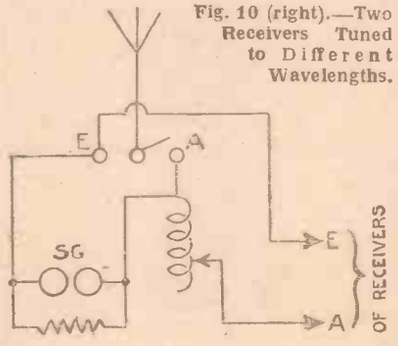
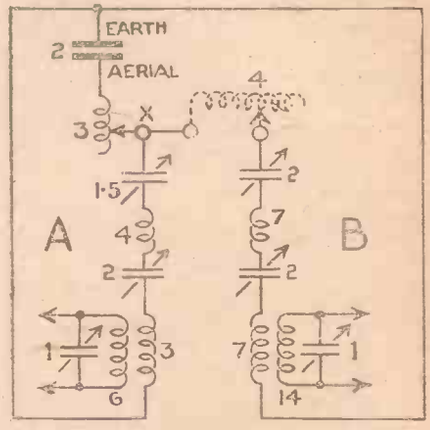


Fig. 10 (right).—Two Receivers Tuned to Different Wavelengths.



Receiving on Different Wavelengths

Whilst on the subject of multiple reception it is necessary to include some remarks on receiving on entirely different wavelengths.

Referring now to Fig. 10, assume that circuit A has to be tuned to 6 LC, whilst circuit B is tuned to 14 LC. The tapping point of the long-wave receiver B is moved from point Y to point X (Fig. 9). The reason for this will be clear if simple numbers are given for the various inductances and capacities and the whole system is analysed.

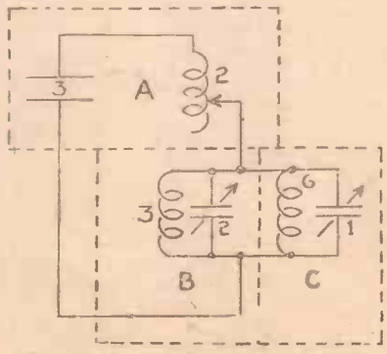
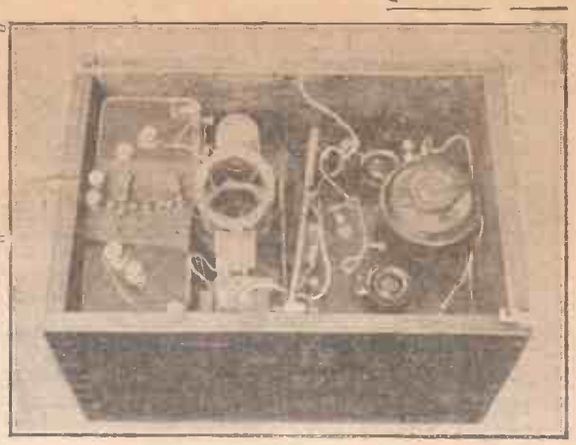


Fig. 5.—Simple Three-circuit Tuner.

5YM'S SINGLE-VALVER



Interior of Single-valve Set.

THE publication of the article "An Evening with a Single Valver" in No. 122 has caused a good deal of comment. There seems to be a large number of wireless enthusiasts who cannot get such results, even on two valves, as I can get on one. Naturally they want to know why.

I may say right at the start that though I can get all the B.B.C. stations, and the Continental stations as well, on my standard two-valve set, I cannot get them with the east and certainty which characterises work with the one-valver. The reason is that two circuits have to be tuned in the two valver, and the tuning of the anode circuit of the radio-frequency-amplifying valve is apt to be critical. It is very easy to miss a station if the two circuits are not in resonance.

Wonderful Efficiency

I put down some of the efficiency of the single valver to my excellent aerial, but I have since tried it out on an aerial that is very inefficient indeed. It consists of a 40-ft. strip of phosphor-bronze ribbon not 20 ft. above the ground and practically on a level with the set. On this aerial London, Bournemouth and several more distant stations have been heard, the distant stations faintly but still readable. Chelmsford, sixty miles away, is very loud.

As I explained in the original article, the set was originally built up as a portable Flewelling. But a switch is incorporated to allow it to be used as a "straight" single-valve circuit, and it was as a straight single-valve circuit that I used it. Fig. 1 shows the circuit as it actually is, including the Flewelling connections. When the switch is in position 1 the circuit is an ordinary single valver, with no features that distinguish it from any other ordinary single-valve circuit, with the exception of the provision of a variable grid leak, which is a Watmel with a range of from 0.5 to 5.0 megohms.

In position 2 the switch turns the circuit into a simple Flewelling by connecting the plate circuit straight through to earth and putting a blocking condenser of .006 microfared in the negative side of the high-tension supply. It is important that the switch be so arranged that the arm cannot make contact with both studs at once. If it does the H.T. battery will be shorted through the telephones. C2, the grid condenser, has a value of .0003 microfarad. C1 is a three-plate vernier condenser. In actual working another tuning condenser, an old ex-W.D. Marconi, is shunted across earth and aerial or put in series with the aerial, as circumstances require. This variable condenser has a maximum capacity of .001 microfarad. It could equally well have been put in position C1, but in this case the inclusion of a vernier would have been a convenience.

The panel is of ebonite 5½ in. by 8 in. A wiring diagram is shown by Fig. 2. The valve is mounted on the under side of the panel. The mount is actually one of the blocks that come off old army one-valve receivers or transmitters. These blocks have most excellent valve sockets with very little capacity between them. They are in the form of an L, as shown in Fig. 3. A coil holder is mounted close to the panel, inside the box which carries the whole outfit, and leads are taken from the aerial and earth terminals and from the reaction terminals to the holder.

As a Flewelling

When the circuit is operated with the Flewelling switch in on an ordinary outdoor aerial, with the customary earth connection, it behaves excellently.

There is no whistle and telephony is very loud and clear. It seems to be almost exactly the same as the single-valve straight circuit, except that the reaction coupling has to be much looser. The set can be used in either way, and I can detect no difference either in signal strength or in distant reception.

Since I wrote the original article a big change has been made in this set. It has had a note-magnifier valve added to it. This is to enable it to work a loud-speaker.

I find myself quite at a loss to account for the excellent performance of this little set. The wiring and components of the main panel are well spaced, but there are any number of exterior leads wandering all over the place. For broadcast reception Lissen coils are used, and for the

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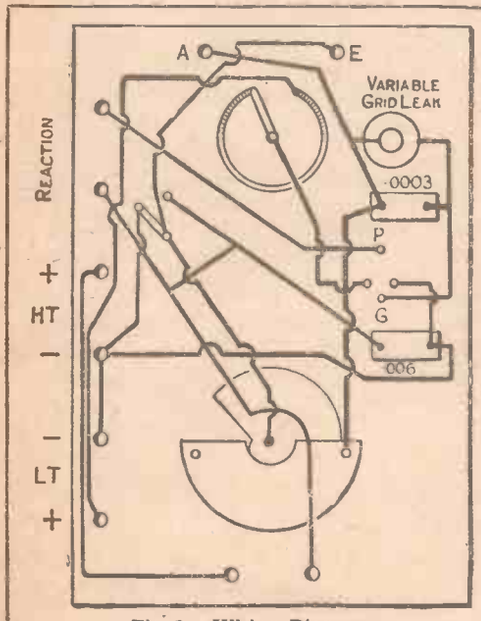


Fig. 2.—Wiring Diagram.

Fig. 3.—Valve Socket.

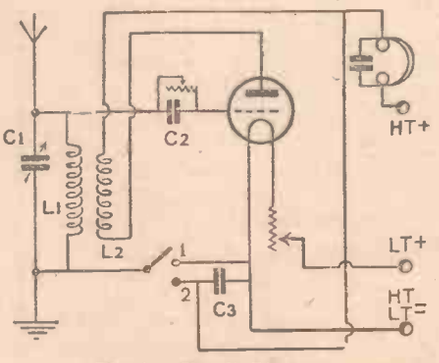


Fig. 1.—Circuit Diagram.

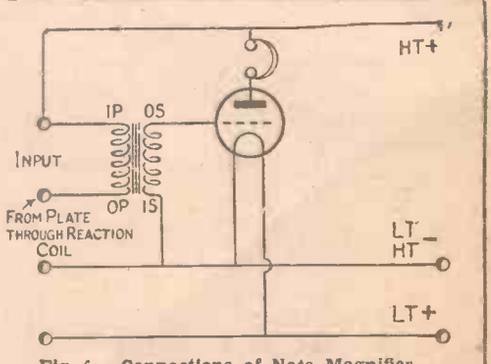


Fig. 4.—Connections of Note Magnifier.

CRYSTAL TALKS.—IV

METHODS OF CONNECTING COILS.

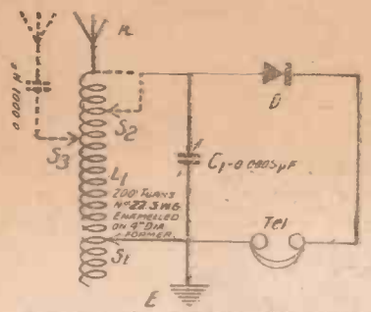


Fig. 1.—Connections for Slider Coils.

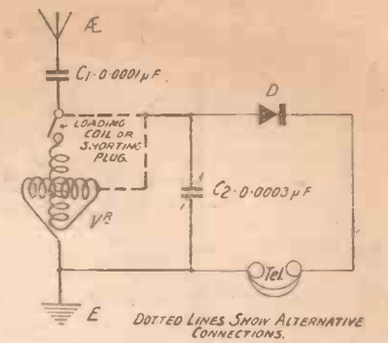


Fig. 3.—Variometer Connections.

THE methods of connecting coils in the circuit are varied and plentiful. Some examples are given in Fig. 1 of different ways of connecting single, double or triple slider. Sliders as a rule are inefficient, especially those of the plunger type. Tapped inductances may be connected as shown in Fig. 2. Variometers may be connected as shown in Fig. 3. A variable condenser is shown in parallel with the inductance in Figs. 1, 2 and 3. While not entirely necessary for local reception, this arrangement affords extra fine tuning facilities. Where connection is made to the rotor of the variometer in Fig. 3, the variable condenser tunes the rotor only, the stator acting as an aerial tuning coil. This is, in fact, an excellent method of obtaining independent rotor-tuning, as this portion of a variometer is not easily tapped.

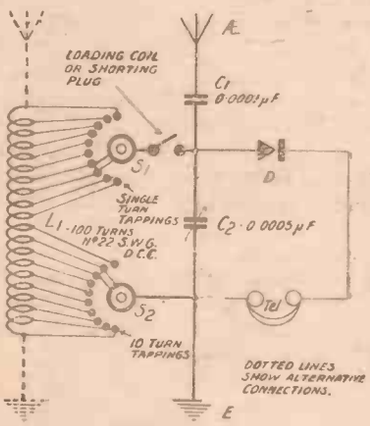


Fig. 2.—Tapped-coil Connections.

Plug-in coils may be connected in almost any convenient manner, and a receiver equipped in the following manner will be found to be a source of continued interest. First equip your receiver with a three-way tuner (see Fig. 3, p. 677). Connections are then made to terminals as shown in Fig. 4. This arrangement enables the experimenter to use them as follows: (1) He may use a single plug-in coil for the aerial-tuning inductance (A.T.I.) in a simple crystal circuit. (2) Two coils may be employed for a loose-coupled arrangement. (3) Two or three coils may be connected in series for the A.T.I. giving a variometer tuning effect. (4) Coil No. 3 may be utilised for reaction when a valve unit is employed. (5) Aperiodic tuning may be effected by connecting the aerial midway or part way down the total inductance represented by two or three coils in series. (6) A coil may be placed in series with the aerial in addition to the A.T.I. (7) A fixed condenser of .0001 microfarad may be placed in series with the aerial or a variable aerial-tuning condenser (A.T.C.). (8) Separate variable condenser units may be placed in parallel with any of the coils used.

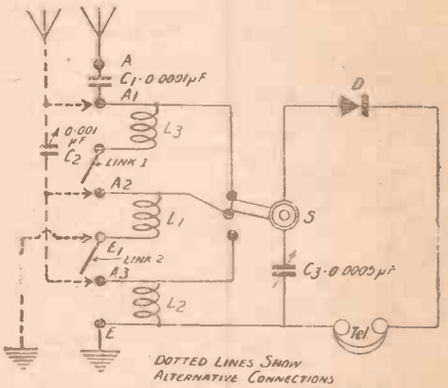


Fig. 4.—Connections for Plug-in Coils.

RADIO.

GETTING DOWN TO 100 METRES

PERHAPS the loudest American station to be heard in Great Britain is KDKA, of East Pittsburg, which until recently worked on 100 metres. Its power is 25 kilowatts, and KDKA's transmission can sometimes be picked up on a modest indoor aerial.

On such a short wave as 100 metres we have to overcome difficulties which do not exist on the broadcast wavelength, the tuning is excessively sharp, and if we are not careful there is a good deal of leakage by capacity. For this reason it is a good idea to use an anti-capacity valve, such as the well-known V24 manufactured by the Marconi-Osram Co.

Since the natural wavelength of most aerials is in the neighbourhood of 150 metres, we must have some special means of getting down to low wavelengths. A most efficient way of doing this is to sling a counterpoise earth directly beneath the aerial. A suitable counterpoise consists of a wire equal in length to the aerial and carefully insulated from the ground. A well-spaced basket coil with a .0002-microfarad variable condenser in parallel will give excellent results if good thick wire is used. A very efficient coil can be made of a thin cardboard former and twelve turns of No. 14 d.c.c. wire tapped at the sixth, ninth and twelfth turns respectively. Valve legs and sockets should be used instead of the more usual selection switch.

Alternatively a .0002 fixed condenser can be placed in series with the aerial and a direct earth used; special care must be taken to ensure a really short and effective earth lead.

KDKA (now testing on 68 metres) can be heard on one valve (with reaction) almost any night after 11 p.m. (G.M.T.) provided that the aerial is up to the mark. The transmissions begin at 11 p.m., but there is a marked improvement in signal strength after midnight, and the volume reaches a maximum intensity towards 3 a.m.

G. J. M.

"5 Y M's SINGLE VALVER" (*continued from preceding page*)

higher wavelengths Igranic coils. The valve is a Marconi DE3.

The valve used in the note magnifier is a French Mikro. A DE3 would serve equally as well with the same low current consumption. Fig. 4 shows the connections for adding a note magnifier to the set. Here again the circuit is perfectly straight. As only 3 volts are used for filament heating, no filament resistance is used.

5 Y M.

THE NEW GLASGOW STATION

THE new headquarters of the B.B.C. in Glasgow are a vast improvement on the original premises, which latterly became most cramped and inconvenient as the work of the station increased. The official opening by the Lord Provost of Glasgow on November 6 provided a most successful broadcast, and in the musical programme a special feature was the augmented orchestra under Sir Landon Ronald.

Three flats of a large building in Blythswood Square are now occupied by the B.B.C., and in addition to the usual station offices there are also situated here the headquarters of the assistant controller for Scotland, Mr. Millar Craig, and the superintending engineer for the north, Mr. J. M. Cameron.

The dimensions of the new studio at 5 S.C are approximately 40 ft. by 25 ft.; two large microphones of the latest type are installed. There is also a small "talks" studio in another part of the building. The general arrangements of the studios, such as draping, etc., are of the usual character. The main studio is on the first floor, and close by is the primary amplifier.

It is no longer necessary to have the artist who is broadcasting visible to the operator of the control, and so the latter are placed in the basement for reasons of convenience. Here also is the secondary amplifier, which receives the telephony after it has been dealt with by the primary. It is then passed on to the transmitting station at Port Dundas over a mile away.

The amplifying gear is a great advance on what was used at the old station, and a complete stand-by set is in constant readiness in case of a breakdown. A change over can be effected with practically no interruption of the programme. On the S.B. board are private lines to London, Aberdeen, Edinburgh and Dundee.

"An Electric Lamp for the Dressing-table" is illustrated and described in the current issue of "The Amateur Mechanic and Work" (3d.). Other articles appearing in this number are: "A Condenser-tuned Crystal Set"; "Working in Vulcanite"; "A Book and Magazine Stand"; "Tinning Cast-iron Utensils"; "Motor-cycle Practicalities"; "Cutting Glass Tubes for Crystal Detectors"; "Notes by the Way"; "A Lean-to Greenhouse"; "Glasspaper or Emery Polishing Cones"; "Three Puzzle Joints for the Woodworker"; "A Chat on Lantern Slides"; "Our Small Car Page"; "The Beginner's Microscope"; and "Fishing for Grayling: The Tackle and Lines."

We want programmes with some punch in them, says a critic. Wasn't the Firpo-Wills fight good enough for him?

SOMETHING TO WRITE FOR

THE current issue of the *Wireless Bulletin* has been received from G. Davenport (Wireless), Ltd., of 69 and 70, Dean Street, Oxford Street, W.1.

W. H. Tant and Co., of 107, Dolman Street, Vauxhall, Birmingham, state that they now supply ebonite and erinoid moulded and turned parts, panels, etc., for the wireless trade.

We have received from L. McMichael, Ltd., of Radio Corner, 179, Strand, W.C.2, a very interesting catalogue of a large array of wireless sets and components. A handy reference system has been adopted that enables the particulars of any part or set to be ascertained in a moment.

A showcard, together with literature on the Mars aerial wire, has been sent us by E. and W. G. Makinson, Ltd., of Preston.

The name of Mr. Baldwin should be added to the catalogue of Cabinet set-makers.

We learn that the chatter of the Zoo parrots is to be broadcast. A good many of us had enough of that during the election.

DUTCH VALVES

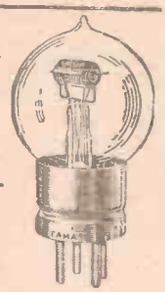
TRADE DISCOUNTS

0·06 DULL EMITTER

Will take from 20 to 100 volts on the anode, thus enabling fullest volume of sound and no extortion.

Filament volts	Anode.	Amps.
1·6 to 2·0	20—100	0.06

Price Retail **12/-** each.



"R" TYPE DETECTOR

Fil.volts.	Anode.	Amps.
3·8—4·0	30 to 60	0·5

Price Retail **4/11** each.

TUBULAR TYPE AMPLIFYING

Fil. volts.	Anode.	Amps.
3·8 to 4·0	30 to 60	0·5

Price Retail **4/8**

"Powquip" Transformers Ratio, 5 to 1 guaranteed heavy wound, each **12/6** retail.

Every valve exchanged if same lights but does not function.

Buy direct from—

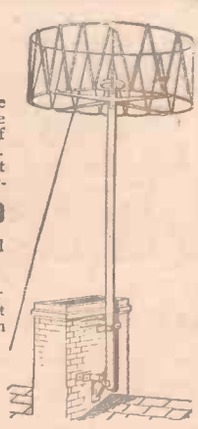
BISHOPSGATE ELECTRIC SUPPLY (1924) CO.,
180. Bishopsgate, London, E.C 2

Phone : Central 7361. **Kindly remit postage**

Lieutenant-Commander Mandrason's

VERTEX AERIAL

(Patent No. 216659)



Hundreds of users say that the "VERTEX" is the most compact, attractive and efficient aerial on the market. Easily attached to chimney-stack or face of wall, as shown, it increases range, volume and purity. It has one mast only, and can be installed in the most confined space. The "VERTEX" obviates "interference." Complete with 50-ft. downlead, 4 insulated arms and central steel hub bracket, ready for mounting on mast ... **£3 15 0**
Steel wall brackets, with bolts, nuts, Rawlplugs and screws can be supplied.

"VERTEX" INDOOR AERIAL

A most efficient long-range "VERTEX" Indoor Aerial is also made for use where outside aerial is not possible. Can be suspended in loft under roof or in a top room. With 35-feet down-lead, insulated cords and ring for suspension. **£3 15 0**

Trade Enquiries Invited

WIRELESS APPARATUS LTD.,
36 Panton Street, Haymarket, S.W.1.

WatMel REGD.

Patent No. 216658

Send P.C. for Descriptive Folder.

VARIABLE GRID LEAK ... 2/6
ANODE RESISTANCE 3/6

Continuously variable, silent in operation, dust and damp-proof. The resistance elements are made by a special process and are perfectly dry. Every Grid Leak and Resistance is tested and guaranteed.

Beware of imitations. See the Watmel Trade Mark on every Grid Leak. Note the new address.

WATMEL WIRELESS CO.
332a Goswell Road, London, E.C.4
Telephone: 7070 Clerkenwell.

"MURRIS" SOLID OAK STANDARD CABINET
WITH LOCK

for any kind of receiver. Bottom cupboard with lock for accumulators and stores. Height, 3 ft. 6 in.; width, 2 ft.; depth, 15½ in. Back Panel removable. *Further particulars on application.*

Price £4 10s. part carriage and packing 7 6 extra

Solid Oak Wireless Table with large drawer and bottom shelf for accumulator. Length, 25 in.; width, 16 in.; height 26 in., 27/6 carr. pd.

M. VERSTRAETEN
(Dept. 10), Melvill Chambers, 50a, Lord Street, Liverpool

THE MAKER'S REMINDER

The little tongues of metal you see on your new component are there as a reminder to you from the makers that this instrument is best soldered into your circuit.

You may say to yourself—"Why should I bother to solder when I can easily screw or twist a wire into position—besides, soldering is hard to do, and messy as well."

Make no mistake about it. If you want the best out of your set you must give it of *your* best—solder every connection—spare not one, and you will be delighted with the great improvement of the receptive qualities.

Soldering is made simple by the use of the famous FLUXITE, and thousands of wireless enthusiasts will testify to the wonderful aid FLUXITE gives them when they go a-soldering.

Ask your Ironmonger or Hardware Dealer to show you the neat little

FLUXITE SOLDERING SET

PRICE **7/6**

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.

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., 32, Bevington Street, Bermondsey, S.E. 1.

ANOTHER USE FOR FLUXITE
Hardening Tools and Case Hardening all KRYPTALLOY ware can be had

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FORGET THE REST AND BUY THE BEST

PORTLAND

LOW FREQUENCY

TRANSFORMER

FOR CLARITY AND STRENGTH OF TONE.

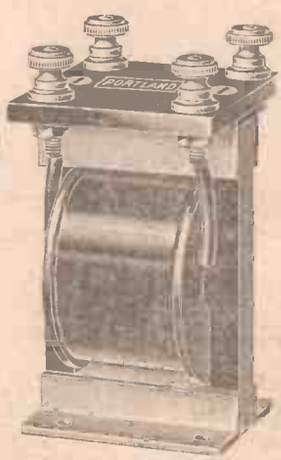
PRICE

12/6

EACH

THE SECRET'S IN THE WINDING.

British Made.



FREE FROM NOISES

Every Transformer tested and inspected before despatch.

Surprisingly better than others at higher price.

Manufactured by very latest methods ensuring uniform results.

Suitable for every stage of valve or crystal amplification.

Thoroughly insulated between windings.

Adopted by many manufacturers of first-class sets and amplifiers.

UNCONDITIONALLY GUARANTEED

Thousands in use giving absolute satisfaction. Not one returned to us during the last six months.

OBTAINABLE FROM ALL HIGH-CLASS DEALERS.

Manufactured by:

PORTLAND WORKS, 84, HIGH St., Marylebone, W.1

BETTER THAN THE BEST OF THE REST

ARMISTICE DAY IN SCHOOL

ARMISTICE Day this year found me in a large school in the north of England, and it was my good fortune to be able to hear the reception of the Armistice commemoration service broadcast from one of our main broadcasting stations.

On most previous occasions I had observed the two minutes' silence as one of the great crowd of business men who collect round about Whitehall in London within earshot of Big Ben. On another occasion I had taken part in the same simple service of homage out in British Columbia. But I can safely say that on no previous occasion was I impressed so much as I was this year.

Nearly a hundred girls and boys stood in the large school hall. Some of them were only ten years old, some were even younger. The oldest amongst them could not have been more than fourteen. Their recollections of the war must have been very slight.

The set used was a three-valve receiver (one detector and two low-frequency amplifying valves). Only the loud-speaker was new to me—a Puravox.

Promptly at 10.45 a.m. the little folk lined up for the ceremony. By accident the operator, one of the teachers, got on to a relay station—Nottingham—and the beautiful music of Elgar's "Land of Hope and Glory," played by a band, was heard. Following this the voice of a bishop reading prayers came through clearly.

At five minutes to eleven the tuning was altered to Manchester. Three minutes before the hour the bugle call, the "Last Post," came through with wonderful clearness. I could not help noticing the marked effect on two ex-army officers amongst the teachers. Their shoulders squared up, they stood at attention, and their faces took on that steady immobile look so familiar to those with experience of army ceremonial parades.

During the two minutes' silence one or two local oscillators could be heard faintly, but no one took the slightest notice nor was the effect spoiled by these wireless irrepressibles. The "Réveillé" came through as clearly as if the bugle had been in the room. After one verse of that grand hymn, "O God, our Help in Ages Past," the set was switched off and the children sang the hymn through themselves.

There are still people to be found who maintain that wireless reception is soulless and that the various items broadcast fail to "get over." I wish such people could have been with me on Armistice Day. They would have seen that a simple commemoration service received by wireless as I saw it received could be as impressive, perhaps more impressive, than any other type of Armistice commemoration service.

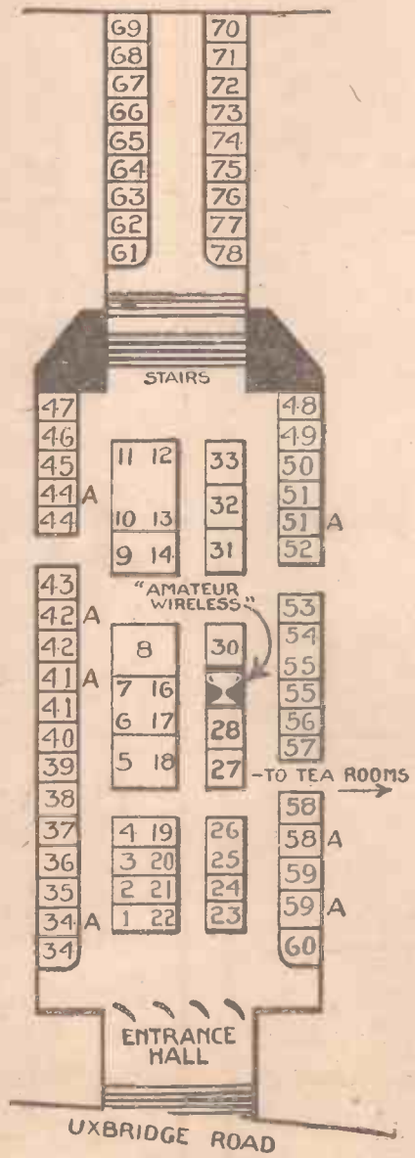
B. P.

WHITE CITY EXHIBITION

For the convenience of our readers we reproduce a plan of the Exhibition, together with a list of exhibitors. Details of individual exhibits were given in our last issue. "Amateur Wireless" is offering a very handsome silver cup as first prize in a competition for wireless novelties.

Stand Number. — *Name of Exhibitor.*

1, 22.—Fellows Magneto Co., Ltd.
2, 3.—J. W. B. Wireless Co.
4.—Victoria Electric Co., Ltd.
5, 18.—New Times Sales Co.
6, 7, 16, 17.—Oldham & Sons, Ltd.
8.—New London Electron Works, Ltd.
9, 14.—Igranic Electric Co., Ltd.
10, 11, 12, 13.—Pettigrew & Merriman, Ltd.
19.—Sel-Ezi Wireless Supply Co.
20.—India Rubber, Gutta Percha and Telegraph Works Co., Ltd.
21.—Tungstalite, Ltd.
23.—Seagull, Ltd.
24.—Wireless Service.
25, 26.—City Accumulator Co.
27.—Penton Engineering Co.
28.—Neutron, Ltd.
29.—AMATEUR WIRELESS.
30.—Telegraph Condenser Co., Ltd.
31.—A. K. U. Co.
32.—J. V. Mulholland.
33.—Fuller's United Electric Works, Ltd.
34.—Stella Products.
35.—Henry Joseph & Co.
36.—F. Yates & Son, Ltd.
37.—F. H. Middleton.
38.—A. W. Knight.
39.—Harding, Holland & Fry, Ltd.
40.—Jeb Trading Co.
41.—Formo Co.
42A.—Burwood Electrical Supplies Co.
43.—Precision Screw Co., Ltd.
44.—Portable Utilities Co., Ltd.
45.—Wireless Retailers Association.
46.—Morch Bros., Ltd.
47.—Bullen.
48.—Lighting Supplies Co., and Ecco Radio Co.
49.—Hart Collins, Ltd.
50.—Sydney Jones & Co. (London), Ltd.
51.—Refty Electrical Appliances, Ltd.
51A.—Radio Improvements.
52.—M. W. Woods.
53.—Gran-Goldman Service.
54, 55.—Read & Morris.
56.—Peronet, Ltd.
57.—Abgar Electrics.
58.—Klein Bros.
59.—A. R. Avent.
59A.—American Hard Rubber Co.
60.—Superlamp, Ltd.
61.—Energo Products, Ltd.
63, 64.—Competition Entries.
65, 66, 67, 68, 69, 70, 71, 72, 73, 74.—Demonstration Hall.
75.—Entries for AMATEUR WIRELESS Inventions and Novelties Competition.



BROADCASTING FROM A PIT BOTTOM

THAT the ingenuity of the B.B.C. programme compilers has by no means come near its end is evidenced by the broadcasting of a pit-bottom concert that is to take place on November 28.

The pit is at Normanton, and the experiment is being carried out by the courtesy of Henry Briggs, Son and Co., Ltd., who own the Whitwood Colliery.

A talk on coal mines will be given by Prof. James Riton, B.Sc. Mr. George R. Lister will tell of his experiences at the pit bottom. These items will be followed by selections by the silver prize band run in connection with the colliery.

"**Europe Calling**."—In the article published in No. 128 under the foregoing title it was inadvertently stated that the German stations terminated their programmes with the playing of "Heil Dir im Siegekranz" to the melody of "God Save the King." This should read: "Deutschland, Deutschland ueber Alles," the tune of which is known in this country as "Austria." This was dropped by Germany as the national anthem when the republic came into being, the former being used by the Monarchist party now only.

A CHRISTMAS COMPETITION FOR ALL

A FIRST PRIZE OF THREE GUINEAS AND OTHER PRIZES OF HALF A GUINEA IN A SIMPLE COMPETITION OPEN TO ALL

WE invite every reader to send us by first post on Monday, December 1, 1924, an interesting letter, of from 250 to 400 words, on "My Ideal Wireless Christmas."

To the writer of the letter adjudged by the Editor to be the most interesting, a prize of Three Guineas will be awarded, and to the writers of any other letters published 10/6 will be paid.

Rules.—The Editor's decision will be final; letters must be written on one side of the paper only; the copyright of all letters published will be ours; all letters must be received not later than first post on Monday, December 1, 1924. No correspondence regarding the competition can be entered into.

Envelopes must be addressed :—Competition, The Editor, "Amateur Wireless," La Belle Sauvage, London, E.C.4.

AMATEUR RECEPTION OF AUSTRALIA

MR. FREDERICK WALKER, of Walton-on-Thames, has succeeded in picking up wireless signals from Australia on a home-made two-valve set. On Wednesday, November 12, he was trying to get New Zealand on a wavelength of 90 metres when he heard faint Morse signals from A 2 M E, Victoria.

On Thursday, November 13, at 6.50 a.m. he picked up signals on 93 metres from 3 P Q, Box Hill, Victoria, which continued readable until 7.15 the following morning.

IPSWICH AMATEURS' EXHIBITION

THE two days' exhibition organised by the Ipswich and District Radio Society, and held on November 11 and 12, was a great success. All who paid a visit to the Church Institute Hall were much impressed by the exhibits.

In all letters to advertisers please mention "Amateur Wireless."

ELECTRADIX

The Government Surplus Wireless Depot

New Bulk Deliveries from R.A.F. Depots and Cable Stations

Absolutely the Finest Show of High Grade Radio Instruments in London. Many New Bargains! Prices a fraction of Cost!

Another 2,000 "C" EDISWAN VALVES offered at 6/3 (by post at buyer's risk). Clips, 6d. Adaptors, 4-leg, 1/-. The cheapest high frequency, low capacity detector-amplifier ever offered. Detects, amplifies. Ask your local dealer for one.

6/6 each

10,000 New R.A.F. STEEL TUBE MASTS, at 15', 7/8; 20', 19/-; 25', 12/6; 30', 14/-. Scrap your feeble wood pole at once!

This week's SPECIAL BARGAIN is R.A.F. 3-Valve, Mk. IV Amplifier and a True-Tone Loud Speaker for £3 15s. Equally good for crystal or valve set. 100 sets only.

ALTERNATORS selling fast. You should secure one at the bargain price before it is too late.

D.C. DYNAMOS, the R.A.F. charging sets, enclosed type, ball bearings, etc., costing £15 and quite new, are offered at £3 D.C. high tension machines. Marconi 1,500 v. 12 m/a, £8. M. G. Mortley, 1,200 v. 90 m/a, £22. M.G. B.T.H. 750 v. 80 m/a, £10. 2,000 volts, 2 kw. £35. 10,000 Electric Canole Lamps, 220 volts, 10/- per doz.

RECORDING OF WIRELESS SIGNALS. The great demand for R.A.F. Morse Inker Recorders indicates the great interest taken in recording distant wireless signals. Cost £40. Few left at £6 10s.

200 WATT MIDGET ALTERNATORS, 52A

The most perfectly made little Generator used on aircraft, gives 500 cycles 10 volts 20 amps, weighs 7½ lbs., in aluminium cover. The Generator of unlimited possibilities. The machines are unused and fully guaranteed. With quite a small transformer, any H.T. voltage from 100 volts up to 3,000 volts may be obtained, smoothed and rectified for plate H.T. The wonderful little machines cost £30, and are given away at 70/- each.

PHONE BARGAINS. Single L.R. Receivers, by Siemens, Western, etc., 1/6 and 2/- each. 2,000 ohms, 4/-. New Sullivan L.R. head sets, 5/6, 2,000 in stock. Fr. Thomson-Houston, brand new, 25/-. Head sets for 14/6. 750 in stock. W.D. Western head sets, 4,000 ohms, 12/6 pair. Brown's micro-amplifiers, less reed and button, 27/6. "True-Tone" Loud Speakers, large adj. lam magnets, 4 000 ohms, polished wood base, rubber feet, ebonite horn, etc., 35/-, reduced to 20/- Best British.

Put a .03 mfd. CONDENSER across your H.T. battery. Neat and effective, 1/6 each. Mica condenser squares, 2,000 thick 2½" × 2½", 6d. per doz. R.A.F. Watershed insulators, 1/6 per doz. Loud speaker or 'phone extension wire for indoors, insulated with enamel and double cotton, 100 yds., 2/-. Heavy twin battery flex, rubber and glace cotton, 3d. per yd, 5,000 yds. in stock, 18-gauge earth wire, 1/3 doz. yds. Earth spikes, 1/3. Copper gauze counterpoise earth. Lay under carpet when no earth convenient, 15/-. REMOTE CONTROL Switches, 15/-.

AERIAL WIRE. 7/23 copper, 50', 10d.; 100', 1/3; 110', cartridge aerial, 1/3. Morse practice outfits, 5/6. 25,000 pairs zincite-bornite crystals in Perikon cups, 6d. pair. Folding frame aerials, 21/6.

RECEIVERS. Here are the Bargains. A complete outfit for 10/-, comprising 30 C. tuner and enclosed detector, 50' aerial wire and insulators, with single headphone. Guaranteed 20 miles. Other crystal sets, 30 C1, with lid, 17/6. Large roll top B.W.G., 37/6. Mark III* short, medium or long wave. The finest Government set ever made. £5. Marconi ship receivers, £4 10s. Crystal and 1-valve. B.W.G., roll-top, £3. 2-Valve Mk. III, for 200-1,800 metres, in mahogany case with lid, absolutely complete and tested O.K. Works loud-speaker 30 miles. Thoroughly recommended. £4. R.A.F. 3-valve portable Mk. III aircraft, 75/-. R.A.F. No. 10 aircraft, 3-valve, £5 5s. (Prices less valves.)

AMPLIFIERS. See bargain above. T.B. 2-valve for crystal sets, £2. Gen. Radio Co's 2-valve £3 10s. 6-Valve H.F. and L.F. Mk. IV, £5 10s. 7-Valve Marconi 55, £8. Brown's micro. amp. less reed and button, 25/-.

INSTRUMENTS. First-class high grade instruments. No Hun stuff! We have the finest stock in London of ex-W.D. precision instruments of accuracy by Elliott, Nalders, Weston, Paul, E. and E., etc., in all ranges from microamps up to 1,000 amps. A W.G. 375 mounted in a crystal panel will indicate the signal strength exactly. Price 65/- and guaranteed perfect. Megger insulation sets from £12. Wheatstone bridges, 45/-. 500 Resistance boxes by Sullivan, Campbell, Muirhead, etc., in all ranges. Fitted ebonite panel with plug top or switch. Prices 10/- to £3. Stamp for special list or state requirements. Large stock of laboratory condensers by same makers, with plug or switch for ranges from ¼ mfd. to 8 mfd. Beautifully made in polished mahogany cabinets. Cheap to callers. Vertical galvos., 17/6. Horizontal, 20/-. G.P.O. detectors, 15/-.

TRANSMITTERS. All types in stock. Spark 1" sets, with tuner, condenser and key, 15/-. 2" Spark, 52 B., 35/-. One-valve Wilson tuner, 30/-. 1,000 volt generator, for ditto, £3. One-valve Trench M.III transmitter, with telephony accessories and H.T. unit, £7 10s. 2-Valve aircraft transmitter, with remote-control. £3 10s. (Prices less valves).

WAVEMETERS. Surely you have a wavemeter! No? Then no wonder you oscillate! We have the finest of the Government types in stock by Paul and other instrument leading makers. Broadcast Townsend, £2 10s. Long range, 120/4,000 metres, £6. Station wave-testers, 120/3,000, £5. Famous Forward, 80/9,000 metres, £7 10s. Special for American stations, 40/1,000 metres, £4. All to N.P.L. standard. Accuracy guaranteed. Order a wavemeter without delay. G.R.C. variometers, half price, 9/6. Vario couplers, 12/6. 16" spark certs, Marconi, £4.

We could fill all the advertisement pages of this journal and then not exhaust our stock list, so please send 4d. in stamps for our 68 pages of illustrated catalogue and list.

It will save you pounds and a lot of time. Call if you are in London, as we are close to Aldgate Metropolitan Railway Station, to which trains run from everywhere. Buses pass the entrance.

LESLIE DIXON & Co.,

9, COLONIAL AVENUE, MINORIES, E.1.

On Bus Route. *Near Aldgate Met. Rly. Station*

Telephone—Avenue 4166. CALL AND SEE STOCK Telegrams—Electradix, Ltd.

Barclays N.A.Z.

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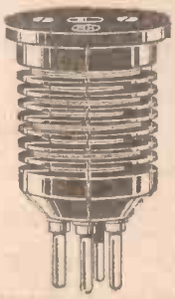
COMPONENTS

H.F. TRANSFORMERS



A series of H.F. plug-in transformers in six ranges of wavelength. They are made of our highly polished non-loss ebonite. The windings are carried in staggered slots, well protected, ensuring low self-capacity and high efficiency. Each transformer is tested to a standard oscillator and any not coming within very narrow limits are rejected. Perfect matching is thus ensured.

No. 00.	80 to 150 metres	...	10/-
No. 0.	150 to 300 metres	...	10/-
No. 1.	300 to 600 metres	...	10/-
No. 2.	550 to 1,200 metres	...	10/-
No. 3.	1,100 to 3,000 metres	...	10/-
No. 4.	2,500 to 7,000 metres	...	10/-
The Complete Set		...	55/-

Any number of each transformer can be supplied matched at NO extra charge if specified at time of ordering.

L.F. TRANSFORMER

A high-grade and efficient Transformer of pleasing design for all intervalve purposes, possessing the best possible electrical characteristics. A point to observe in the design is that the fixing down lugs can easily be got at. The screwdriver when screwing in the holding down screws is not fouled by any portion of the transformer. Each transformer tested to 1,000 volts.

Price in carton ... 21/-

FIXED CONDENSERS

Each supplied with two Clips.

PRICES:

0.001 μF to 0.0001 μF 1/9 each

0.01 μF to 0.002 μC 2/3 each

We introduced, and have adopted as our standard, the flat type fixed condenser which slips into two clips. They are made of high-grade ruby mica and tinfoil. Connection is made by their solid metal ends to two spring clips which go directly under the terminal nuts, thus avoiding at least two connections. This type is a distinct advance in the design of the fixed value condenser; its utility and adaptability are at once obvious and appeal to all users.

The Best results can only be secured through buying and building into your set the best components possible. To achieve this end, insist on having M.H. components; unimpeachable quality and manufacture throughout.

L. McMICHAEL LTD

IN CONJUNCTION WITH B. HESKETH LTD

WIRELESS ENGINEERS

RADIO CORNER, 179 Strand, W.C.2

Barclays, 320.

WITH the completion of the relay station at Dundee, which was opened on November 12, the number of B.B.C. installations in Scotland is increased to four. Glasgow and Aberdeen are main stations, while Edinburgh and Dundee normally draw their programmes from elsewhere.

Several complaints have been made that it was distinctly incongruous to broadcast election results to the accompaniment of the Savoy bands.

John Henry will again broadcast at 7.30 p.m. on Tuesday, November 25. Joe Murgatroyd is to be introduced to the microphone on this occasion.

Mr. F. G. Kellaway, who once was Postmaster-General, has been appointed the managing director of the Marconi Co. He succeeds Mr. Godfrey Isaacs, who has been obliged, under doctor's orders, to resign his position.

Scottish amateurs have struck an indifferent patch in the matter of Transatlantic reception. There are now, however, signs of recovery. After a week or two of excellent reports many experimenters suddenly found themselves almost unable to raise a single American broadcaster.

The evening service from St. Martin-in-the-Fields will be relayed from 2 L O on November 23.

A miscellaneous light programme will be broadcast from 2 L O on Wednesday, November 26. The programme will include songs by Miss Nellie Walker, violin solos by Miss Edith Kelly-Lange, and solos by Miss Toni Farrell, the speciality pianist.

Experiments in transmitting time signals will shortly take place at F L, Paris. By means of photo-electric cells the light of stars passing across the eye-piece of a telescope will actuate a wireless transmitter.

A query programme will be given at the London station on Saturday, November 22. The three most successful competitors will be awarded prizes of five guineas, three guineas and one guinea respectively. In addition these competitors and the next two will be invited to spend an evening in the studio.

Mr. Charles Kilcour Parsons is to be the director of the new Swansea station. He has had a varied and successful career, and for four months recently was assistant station director at Cardiff.

Signals sent out from the wireless exhibition at New York circled the globe eastward in five seconds and westward in six seconds.

Mr. Richard Hughes, whose short play "A Comedy of Danger" was so widely appreciated by all B.B.C. listeners, has written another play entitled "Congo Night," which will be broadcast on November 20.

A "ship's orchestra repeater," designed to enable music played in a saloon to be heard in other parts of the ship, has been developed by the Marconi Co. The liner *Montclare* has been fitted with this apparatus.

Mr. George Bernard Shaw will broadcast from 2 L O his own play *O'Flaherty, V.C.*, at 8.30 p.m. on November 20.

A London amateur, 6 Q Z, Mr. Emery, has been successful in re-transmitting the

(*Continued on page* 802)

RADIOGRAMS (*continued from page* 800)

KDKA concerts by means of a seven-valve supersonic heterodyne receiver and a special duplex-working transmitter.

Mr. R. E. Jeffery, the dramatic producer of the B.B.C., is producing plays for blind people because it is felt that if a play can be produced that pleases the blind it will be good for broadcasting purposes.

It is now definitely announced that the Swansea relay station will be erected at Town Hill near the reservoir. Contracts for some of the work have been put out.

An up-to-date polar installation is being fixed in the R.M.S. *Aorangi,* which is being built for the Union Steamship Co. The installation will consist of a 1½-kilowatt spark transmitter with emergency gear, a C.W. transmitter, an automatic call device, a special long-distance receiver, and a broadcasting receiver with seventeen loud-speakers.

The Liverpool station (6 L V) has moved from Smithdown Lane to St. Domingo Road. The studio in Lord Street is not affected by the removal.

"Clear, sweet, sonorous, spoken without effort, and giving the audience an impression of friendship" is how the ideal broadcasting voice has been described.

Whaling ships plying the North Sea are now fitted with Marconi direction-finders in order to locate each other and avert collisions in fogs or darkness.

The Newcastle Chamber of Commerce has issued a protest against the French order that all vessels between 500 and 2,000 tons gross are to carry wireless receivers.

Sunday broadcasting has commenced at Belfast and the usual regular programmes will be provided.

The French transmitting station 8 D G I reports excellent progress in tests recently made with only 4 watts on a 132-metre wavelength; research in that field is continuing.

Signor Fiamma, an Italian inventor, has made a submarine perform all sorts of evolutions, far from the shore, by simply pressing the buttons of a wireless transmitter. Transmissions from a near-by broadcasting station did not interfere with the experiment.

By a coincidence the wavelength of the longest-wavelength European broadcasting station is ten times that of the shortest-wavelength station—Eiffel Tower works on 2,650 metres and Brussels on 265 metres.

The Radio-Iberica Co. of Spain has recently inaugurated a broadcasting station at Seville, and concerts and news will be broadcast from 7 to 9 p.m. daily.

In order that Germany may possess at least one station fit to compare with Chelmsford and Radio-Paris the power of Königswusterhausen will be increased to 10 kilowatts.

A new high-power station is to be erected at Bolinas with the object of improving wireless communication between South America and China.

There are now 530 broadcasting stations in the United States, and Mr. Hoover (Secretary of Commerce) estimates the number of wireless users at 20,000,000.

After being temporarily closed for repairs, the Lausanne broadcasting station was reopened on November 2.

The Radio Club des Pyrénées states that its members have devised a special method by means of which parasitic noises from near-by motors can be eliminated.

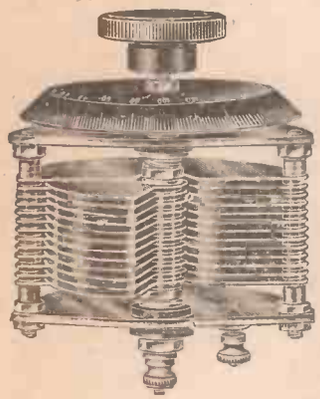
A large broadcasting station is being planned for Agen (in France), operating on a wavelength of 200 metres.

The broadcasting station at Bremen is now completely installed and ready for service. Early tests have been entirely satisfactory to the engineers in charge.

From a New York paper: "For sale: Nine-roomed house, fruit trees, excellent wireless reception, all stations being heard clearly. Price, etc."

The latest development of wireless is the penny-in-the-slot wireless-concert apparatus, installed in an old-fashioned inn near Westminster Abbey. The patron who ventures a penny gets five minutes of whatever fare the B.B.C. is broadcasting at the time.

TWO EFFICIENT LISTŌLEON COMPONENTS



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Prices :—

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.001	8/-	With Vernier 9/6	.0002	5/-
.00075	7/-	„ „ 8/9	.0001	4/6
.0005	6/-	„ „ 7/6	.00005	4/-
.0003	5/6	„ „ 7/-		
.00025	5/-	„ „ 6/6		

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The LISTŌLEON Transformer is so well constructed that we are able to guarantee it for a period of two years.

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The gauge of wire used is such that a current of 20 milliamps can be safely carried continuously. The LISTŌLEON Transformer is therefore eminently suitable for use in conjunction with the biggest types of power valves used for broadcast reception.

The LISTŌLEON Transformer measures 3¾ in. long by 2⅝ in. over terminals, is 3 in. high and weighs 2 lbs. The stampings are best Stalloy, dull blacked; straps and nickel-plated terminals are fitted.

The LISTŌLEON Transformer will free your reception from all harshness, whistling noises and that raucous metallic medley of sound usually associated with loud-speaker reproduction.

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E.P.S. 111

NOTE.—*In the following list of transmissions these abbreviations are observed: con. for concert; lec. for lecture; orch. for orchestral concert; irr. for irregular; m. for metres; and sig. for signal.*

GREAT BRITAIN

The times given are according to Greenwich Mean Time.

London (2LO), 365 m. 1-2 p.m., con.; 3.15-3.45 p.m., lec.; 4-5 p.m., con.; 5.30-6.15 p.m., children; 6.40 p.m. talk; 7-7.30 p.m., time sig., news, talk; 7.30-9.30 p.m., music; 9.30-10.0 p.m., time sig., news, talk; 10.0-1.30 p.m., music. Mon. and Wed. the Savoy Bands are relayed until 11.0 p.m., and on Sat. until midnight. Sat. only, 4-5.30 p.m., con.

Aberdeen (2BD), 495 m. **Belfast** (2BE), 435 m. **Birmingham** (5IT), 475 m. **Bournemouth** (6BM), 385 m. **Cardiff** (5WA), 351 m. **Glasgow** (5SC), 420 m. **Manchester** (2ZY), 375 m. **Newcastle** (5NO), 400 m. Much the same as London times.

Bradford (2LS), 310 m. **Dundee** (2DE), 331 m. **Edinburgh** (2EH), 328 m. **Hull** (6KH), 335 m. **Leeds** (2LS), 346 m. **Liverpool** (6LV), 315 m. **Nottingham** (5NG), 322 m. **Plymouth** (5PY), 335 m. **Sheffield** (6FL), 301 m. **Stoke-on-Trent** (6ST), 306 m. Programmes relayed.

CONTINENT

The times are according to the Continental system; for example, 16.30 is 4.30 p.m., and 08.00 is 8 a.m. (G.M.T.).

AUSTRIA.

Vienna (Ravag), 530 m. (1 kw.). Daily: 08.00, markets; 10.00, time sig., con.; 12.20, weather; 14.30, Stock Ex.; 15.00, time sig., news, con.; 16.15, children (Tue. and Thu.); 18.30, news, weather; 19.00, time sig., con., news; 21.00, dance (Wed. and Sat.).

BELGIUM.

Brussels (SRB), 265 m. (1½ kw.). 17.00, orch., children (Wed. and Thurs.); dance (Tues. and Sat.); 18.00, news; 20.00, lec., con., news (opera, Mon. and Wed.).

Haeren (BAV), 1,100 m. 13.00, 14.00, 16.50, 18.50, weather.

CZECHO-SLOVAKIA.

Kbely (OKP), 1,150 m. (1 kw.). Weekdays: 09.00, 10.30, 12.30, 16.00 and 17.00, Stock Ex.; 18.15, lec., news, weather, con. (time sig., 19.00), daily; 10.00, con. (Sun.).

Komarov (OKB), 1,800 m. (1 kw.). Weekdays: 13.00, Stock Ex., weather, news; 09.00, con. (Sun.).

DENMARK.

Copenhagen (Kjobenhavros Radiofonistation), 750 m. 19.00, con. (Sun. and Wed.).

Lyngby (OXE), 2,400 m. Week-days: 18.20, news and Stock Ex.; 20.00 and 21.00, news, weather and time sig.

Ryvang, 1,025 m. 18.30, Eng. lesson (Wed.); 19.00, con. (Tues. and Fri.).

FRANCE.

Eiffel Tower, 2,650 m. (5 kw.). 06.40, weather (exc. Sun.); 11.00, markets (exc. Sun. and Mon.); 11.15, time sig., weather; 14.45, 15.35, 16.30,* Stock Ex. (exc. Sun and Mon.); 18.00, con. and news (not daily); 19.00, weather; 22.10, weather (exc. Sun.).

* From Nov. 1, on 1st and 15th of each month, at 16.45.

Radio-Paris (SFR), 1,780 m. (10 kw.). Sundays: 12.45, orch.; 13.45, news; 16.45, con.; 20.30, news, con.; 22.00, dance. 12.30, news, Stock Ex., orch.; 16.30, markets, Stock Ex., con.; 17.45, Stock Ex., news, women's hour; 20.30, lec., news, con.; 22.00, dance (not daily).

L'Ecole Sup. des Postes et Télégraphes (PTT), 458 m. (500 w.). 16.00, lec. (Tues. and Thurs.); 20.30, Eng. conv. and con. (Tues.); 20.30, lec. or con. On 3rd Sun. of each month, organ recital, 20.45.

"Le Petit Parisien," 340 m. (500 w.). 21.30, con. (Sun., Tues., Thurs.).

Lyons-la-Doua, 480 m. 10.30, news and con.; 11.30-11.45-12.15, 16.15, Stock Ex.; 20.00, news and con.

Toulouse Aerodrome (MRD), 1,525 m. 09.42, 19.42, weather.

Agen, 335 m. New high-power station testing daily.

Issy-les-Moulineaux, 1,600 m. Tests.

GERMANY.

Berlin (1), Vox Haus, 430 m. (700 w.); (2), 500 m. (1½ kw.). 09.00, educat. lec. (Sun.); markets; 09.15, news; 10.35, markets*; 11.15, Stock Ex.; 11.55, time sig.; 12.05, news; 13.15, Stock Ex.; 14.00, markets*; 14.30, children (Sun.); 15.00, markets*; 15.30, orch.; 16.00, markets*; 17.45, lec., children (Wed., Sun.); Eng. conv. (Mon.); 18.00, Eng. conv. (Mon.), children (Wed.), lec.; 18.45, lec.; 19.30, con., news, time sig.; 21.30, dance (Thurs. and Sat.). Evening lec. and con. from 18.00 relayed by Berlin (2) on 500 m. *On W.L. 500 m. only.

Berlin (Telefunken Co.), 750 m. (1 kw.). 10.30, con. (almost daily); 19.00, con., tests (irr.).

06.30, 19.40. 2,800 m. (4 kw.): 10.50, con. (Sun.). 3,150 m.: Telegraphen Union, 06.00, 20,00, news. 4.000 m. (10 kw.), Express News Service, 06.00, 19.40. 2,800 m. (5 kw.): 10.50,

Königswusterhausen (LP), 680 m. (4 kw.). 09.40, con. (Sun.). 2,450 m.: 10.20, con. (irr.). 2,550 m. (5 kw.). Wolff's Buro. Press Service:

(*Continued on page 806*)

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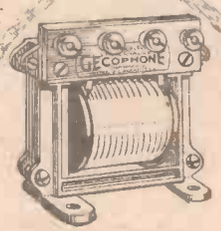

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BROADCAST TELEPHONY (*continued from page* 804)

con. (Sun.). 3,150 m., Telegraphen Union, 06.00-20.00, news (week-days). 4,000 m. (10 kw.): Express News Service, 06.00-20.00 (daily).

Breslau, 415 m. (1½ kw.). 11.00, sacred con. (Sun.); 10.15, Stock Ex., weather; 11.55, time sig., weather (Sun.); 12.25, time sig., weather, Stock Ex.; 14.00, Berlin news; 15.00, children (Sat. and Sun.); 16.30, orch., lec. (Sun.); 18.30, Esperanto (Mon.); 19.30, con. (Sun.); Eng. conv. (Thurs.); con., lec. (other days).

Frankfort-on-Main, 467 m. (1½ kw.). 07.00, sacred con. (Sun.); 10.10, news; 10.55, time sig. and news; 15.00, con. (Sun.); 15.10, markets; 15.30, orch.; 16.00, children (Sun.); 17.00, lec.; 18.30 lec.; Esperanto (Fri.); 19.00, lec., Eng. conv. (Mon. and Wed.); 19.30, con., opera; 20.30, news, weather; 20.50, tech. lec., women's hour; 21.00, time sig.; con. (irr.).

Hamburg, 387 m. (1½ kw.). Weekdays: 06.25, time sig., news; 11.45, markets; 12.00, time sig.; 13.30, markets; 14.00, news, women, markets; 17.00, con.; 18.00, lec.; 19.00, con. or opera; 21.00, weather, markets, sport; 21.50, news (in English), dance (not daily). Sundays: 07.55, time sig., weather, news, lec., women; 10.15, sacred con.; 11.15, chess; 12.15, con.; 14.30, photo talk; 15.30, children; 16.30, con.; 17.45, English conv.; 19.00, con. or opera; 21.00, on as weekdays.

Königsberg, 460 m. (1½ kw.). 07.10, markets (Wed., Sat.); 08.00 sacred con. (Sun.); 10.15, markets; 10.30, con. (Sun.); 11.55, time sig.; 13.15, news, Stock Ex.; 15.00, markets; 15.30, orch., children (Wed., Fri.); 18.00, lec.; 19.00, con., weather, news; 20.10, dance or con. (irr.).

Leipzig, 452 m. (1½ kw.). 08.00, sacred con. (Sun.); 10.55, markets; 11.58,* time sig.; 12.00* and 15.00*, Stock Ex. news; 15.30, con., children (Wed.); 17.00*, markets (exc. Sat.); 18.00, lec., Esperanto (Mon.); 18.30, lec., chess (Wed.); 18.45, Eng. lec. (Tues.); 19.15, lec., con. or opera; 20.30, news; 21.00, dance (Sun.). * Except Sunday.

Munich, 485 m. (1½ kw.). 09.30, sacred con. (Sun.); 13.00, time sig., news, weather; 15.30, con.; 16.00, children (Wed.); 16.30, Eng. conv. (Mon.); Esperanto (Thurs.); 17.00, markets, news, women's hour (Tues. and Fri.); 17.30 and 18.30, con., lec.; 19.30, con., news, weather, time sig.; 20.00, dance, news, weather, time sig. (Sat.).

Munster, 407 m. (1½ kw.). 06.55, time sig., news.; 10.00, sacred con. (Sun.); 11.30, Stock Ex.; 12.00, time sig.; 14.30, markets, news; 15.00, orch.; 18.40, children (Wed. and Sat.), weather, news; 19.15, con. dance (Sat.); 20.15, news. Sun.: 19.00, con., news, dance.

Nuremberg (relay), 340 m. Programme relayed from Munich (q.v.).

Stuttgart, 437 m. (1½ kw.). 10.30, con. (Sun.); 11.00, markets; 15.00, con., time sig., news (Sun.); 15.30, news; 16.30, markets, con., weather, time sig., children (Wed., Sat.), women (Fri.); 17.00, news, time sig. (Sun.); 17.30, weather, time sig.; 18.30, lec. (Mon. and Tues.), Eng. lec. (Fri.); 19.00, lec., con., weather, time sig., news.

HOLLAND.

Amsterdam (PA5), 1,050 m. (200 w.). 19.40, con. (Wed); 20.40, news; 21.10, con. (irr.). (PCFF), 2,125 m.: News and Stock Ex. almost hourly from 07.55 to 16.10.

Ymuiden (PCMM), 1,050 m. 20.10, con. (Sat.).

Hilversum (NSF), 1,050 m. (500 w.). 19.40, con. (Sun.); 20.40, lec. (Fri., irr.); 19.45, children (Mon.).

HUNGARY.

Buda-Pesth (MT1), 950 m. Half-hourly (PTT), 458 m. (500 w.). 16.00, lec. (Tues.) and from 06.45, news, Stock Ex.; 10.00, con.; 11.30, news (daily).

ITALY.

Rome (1RO), 422 m. (1½ kw.). 19.30 to 21.30, con.

JUGO-SLAVIA.

Belgrade, 1,650 m. (2 k.w.). 17.45, con. (Tues., Thurs., Sat.).

PORTUGAL.

Lisbon (Aero-Lisboa), 375-410 m. 20.30, tests, music, speech (irr.).

Montesanto (CTV), 2,450 m. (15 kw.). Tests, music (irr.); 13.00 and 23.00, weather.

SPAIN.

Madrid (Radio Iberica), 392 m. (1½ kw.). 19.15, weather, time sig., Stock Ex., con.; 22.45, con., time sig. (23.14); 23.30, con., dance.

Barcelona, 325 m. (100 w.). New station testing. 18.00 and 21.00.

SWEDEN.

Stockholm (TV), 440 m. 10.10, service, relayed (Sun.); 11.35, weather, time sig.; 18.15, con., news.

Stockholm (Radio-Akt), 470 m. 19.10, con., news (exc. Mon., Wed. and Fri.).

Gothenburg, 460 m. 18.10, con. (Tues., Fri. and Sat.). 680 m.: 18.10 (Mon., Wed. and Thurs.).

Boden, 2,500 m. 17.40, con. (Tues. and Fri.); 16.40, con., news (Sun.).

SWITZERLAND.

Geneva (HB1), 1,100 m. (500 w.). 12.15, lec. No Sun. transmissions.

Lausanne (HB2), 850 m. (500 w.). 07.05, weather; 12.30, weather, markets, time sig., news; 16.00, children (Wed.); 17.55, weather, news; 20.15, con. (exc. Wed.), dance (Thurs. and Sat.).

Zurich (Höngg), 650 m. (500 w.). 12.00 and 16.00, weather, news, Stock Ex.; 17.15, children (Mon., Wed., Fri.), women's hour (Thurs.); 18.00, weather, news; 19.15, lec., con.; 21.00, news. Sun.: 11.10 and 19.15, con.; 21.00, news.

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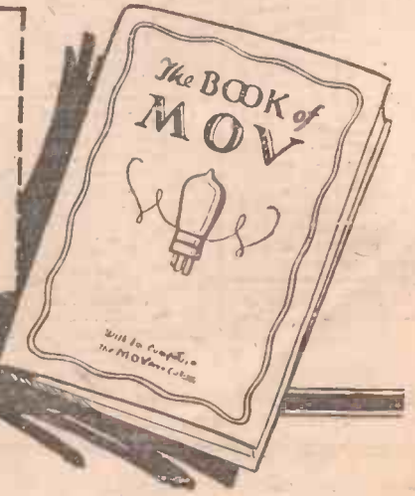

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Amplification

SIR,—The respective merits of H.F. and L.F. amplification depend upon the circumstances of the case. Receiver, aerial, earth, location, distance are all factors which vary to so large an extent that only experiment can show the best results.

To condemn H.F. amplification altogether, as some writers have done, is not sound reasoning. Signals of all amplitudes are on our aerials, but detectors are not efficient below a certain point, and that is precisely why H.F. amplification is desirable for D.X. work.—G. C. C. (London, N.W.).

Dull-emitter Valves

SIR,—We notice in your issue of October 25 a signed paragraph regarding the "Peanut" valve, in which a comparison is drawn between it and the Wecovalve and ARDE types. We would point out that this is hardly a fair comparison, as it is stated that the voltage of the Peanut is higher than that used in the Wecovalve and ARDE, whilst the current consumption is much lower. We would submit that this valve should not be compared with the ARDE type at all, but rather with the ARo6, the filament volts and amperes of which are exactly the figures which your contributor claims for the Peanut.—THE EDISON SWAN ELECTRIC CO., LTD. (London).

Late Transmissions

SIR,—Your correspondent S. J. R. would probably welcome a new restriction on amateur transmitters. If he had to wait up night after night until eleven o'clock before he could start up he would doubtless alter his mind. He may wonder why some of us do not use the low band of wavelengths (150 to 200 metres) and work during broadcasting hours, as we are allowed. I do not do this because many listeners near my station have unselective sets and could not tune out the offending wave. If S. J. R. spent some time altering the tuning of his set he would not be troubled with interference.—M. E. (Shelf).

Radio-Paris and *5XX*

SIR,—I notice that many readers of "A.W." have difficulty in tuning-in Radio-Paris to the exclusion of Chelmsford. Loose-couplers have apparently failed to separate the two transmissions.

My own experience is that nothing but a well-designed wave-trap will cut out 5XX within a thirty-mile radius of the high-power station. My wave-trap consists of the following apparatus: A two-way coil holder, a .0005 variable condenser and a couple of honeycomb coils of 200 and 300 turns respectively. The No. 200 serves as the A.T.I. and the No. 300 as the wave-trap, which is tuned by the variable condenser. The A.T.I. is connected to the set in the usual way.

After Radio-Paris has been tuned in, the wave-trap is brought into play by revolving the knob of the condenser slowly and carefully; a critical point will be reached when the interference from 5XX either fades away or becomes very much weaker; on tightening the coupling between the two coils the jamming will disappear entirely. The A.T.I. is then re-tuned and the Paris station brought up to maximum strength. —G. J. M. (Sutton).

Other Correspondence Summarised

R. E. R. (Cardiff), referring to the article "Musings by Magnet" in No. 126, writes us that his Mullard Wecovalve is the equal of any bright valve in volume and range and is economical in consumption.

F. M. (Ealing) writes us that he receives the B.B.C. stations, most of the French, German and other Continental stations, and a number of American stations on his two-valve Flewelling set.

B. W. (Nottingham) states that the results he obtains from his crystal set, made from instructions given in No. 115, are as loud as any he has heard on a one-valve set. He only uses an indoor aerial.

K. G. (Ashton-under-Lyne) regularly receives American stations, at loud signal strength, on his four-valve set.

CHIEF EVENTS OF THE WEEK

SUNDAY (November 23)

London	9. 0	J. H. Squire Celeste Octet.
Birmingham	8.30	William Murdoch (solo pianoforte).
Bournemouth	3. 0	Band of 2nd Batt. Hampshire Regiment.
Bournemouth	8.50	Mendelssohn Concert.
Cardiff	9. 0	"Hymns throughout the Ages."
Newcastle	9 0	Astra Desmond (contralto) and Walter Gieseking (solo pianoforte).

MONDAY

ALL STATIONS	7.30	Comedy and Romance (from London).
Bournemouth	8. 0	Bournemouth Municipal Orchestra.

TUESDAY

Birmingham	8.30	City of Birmingham Symphony Orchestra (S.B. to London, Bournemouth and Cardiff).
Manchester	7.30	"Under Italian Skies."
Newcastle	7.40	Russian Opera and Ballet.
Aberdeen	7.30	Concert Programme.
Glasgow	8. 0	Scottish Orchestra (S.B. to Aberdeen and Edinburgh).
Belfast	7.30	Irish Night.

WEDNESDAY

Birmingham	7.30	"A Tale of Old Japan."
Bournemouth	7.30	"Pictures."
Cardiff	7.30	Another Bunch of Sweet Lavender.
Manchester	7.30	*A Butterfly on the Wheel.*
Newcastle	7.30	Selections from Opera.
Belfast	7.30	Russian Music.

THURSDAY

ALL STATIONS (*Except Belfast.*)	7.30	Part of the Hallé Concert.
ALL STATIONS (*Except Belfast.*)	8.15	Willie Rouse will introduce a few "Bohemians."
Belfast	7.35	Elgar and other Music.

FRIDAY

Birmingham	7.30	An Evening of Musical Comedy.
Bournemouth	7.30	Operatic and Instrumental Night
Cardiff	7.30	Music and Drama.
Manchester	7.30	Symphony Concert.
Newcastle	7.30	Irish Melodies and Songs of Many Lands.
Aberdeen	7.30	Music—Humour—Drama.
Glasgow	7.45	Scots Play Night.
Leeds-Bradford	7.45	A Concert from the Pit Bottom (1,500 feet deep).

SATURDAY

London	7.30	Band of H.M. Scots Guards *Elijah.*
Birmingham	8.30	The Famous "All Blacks" (New Zealand Rugby Football Team) (S.B. to all Stations except Birmingham).
Cardiff	7.30	Scottish Night.
Manchester	7.30	Vocal Night.
Aberdeen	7.30	Band of 1st Batt. Lincolnshire Regiment.
Belfast		

A new broadcasting station, working on 1,200 metres, will shortly be opened at Kowno (Lithuania).

WE REGRET

That, owing to pressure on our space this week, we are compelled to hold over the "Information Bureau" page. All queries addressed to us are answered by post providing a coupon (p. 815) and stamped addressed envelope are sent us.

A woman at a London police court informed the magistrate that "she could not sleep at night as the wireless next door got red hot and sizzled when it rained." Most amateurs are of the opinion that when any "sizzling" takes place in the receiver it's the language which gets red-hot!

CLUB DOINGS

Sidcup and District Radio Association
Hon. Sec.—MR. L. N. MARTUS, Pilford, Knoll Rd., Sidcup, Kent.
THE above branch of the Radio Association has now been formed, and intending members are asked to communicate with the secretary.

Beckenham and District Radio Society
Hon. Sec.—MR. A. WEST, 8, Manor View, Beckenham.
ON October 30 Mr. Huggett gave a lecture on "How to Make a Wireless Cabinet."

Stoke-on-Trent Wireless and Experimental Society
Hon. Sec.—MR. E. A. HALIBURTON, 73, Stafford St., Longton, Stoke-on-Trent.
AT a meeting held on November 6 a two-reel film was shown entitled "An Englishman's Home." It was loaned by the General Electric Co., and showed the advantages of wireless in the home.

ANNOUNCEMENTS

"Amateur Wireless and Electrics." Edited by Bernard E. Jones. Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. It will be sent post free to any part of the world—3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Postal Orders, Post Office Orders, or Cheques should be made payable to the Proprietors, Cassell & Co., Ltd.

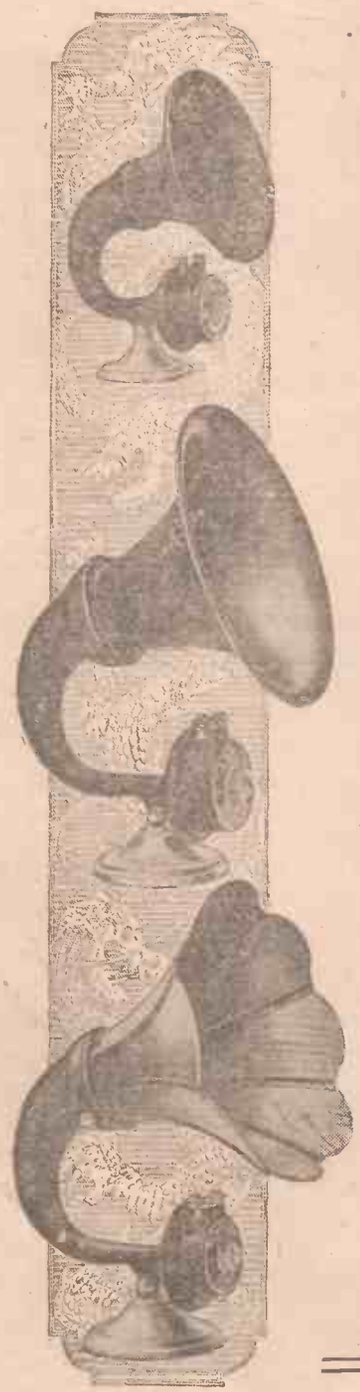
General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets.

Contributions are always welcome, will be promptly considered, and if used will be paid for.

Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed.

Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," La Belle Sauvage, London, E.C.4.

3 additional models to the 'DRAGON' range of AMPLION LOUD SPEAKERS



Here are three particularly attractive additions to the Amplion range—faithful replicas, on a somewhat reduced scale, of the larger "Dragon" models, which have become famous the world over.

Quality for quality the Amplion excels all other Loud Speakers—and the prices are the lowest ever offered to the Radio Public. Each model incorporates exclusive Amplion features, including the new super unit, with floating diaphragm and non-resonating Sound Conduit, a combination affording the most wonderful Clarity and Tonal Purity.

THE "DRAGONFLY" AMPLION.

A miniature Loud Speaker of exceptional merit, possessing for its size, remarkable volume and "full" tone.

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Extra for Mahogany Horn, 3/6

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Obtainable from all Wireless Dealers of repute.

Patentees and Manufacturers:

ALFRED GRAHAM & CO.,
(E. A. GRAHAM)
St. Andrew's Works, Crofton Park, LONDON, S.E.4.

Telephone: Sydenham 2820-1-2. *Telegrams:* "Navalhada, Catgreen, London."

ADVERTISEMENT INSTRUCTIONS for "Amateur Wireless" are accepted up to **first post on Thursday morning** for following week's issue, providing space is available.

PREPAID ADVERTISEMENTS.

Advertisements under this head are charged FOURPENCE PER WORD, minimum charge FOUR SHILLINGS.

PATENTS and Trade Marks obtained.—H. T. P. Gee, Patent Agent, Member R.S.G.B., 51, 52, Chancery Lane, London, W.C.2. Phone, Holborn, 1525.

PANELITE will withstand 5,000 volts, black finish, will not fracture, 6 by 6 by 3/16, 1s.; 7 by 5, 1s. 1d.; 8 by 5, 1s. 2d.; 9 by 5, 1s. 4d.; 9 by 6, 1s. 6d.; 10 by 9, 2s. 2d.; 12 by 10, 2s. 9d.; 14 by 12, 4s. 6d. Post paid. Other sizes and thicknesses pro rata.—Radio Panel Co. (Dept. A), 143, Fetter Lane, London, E.C.4. [17 r

HEADPHONE REPAIRS.—Rewound, re-magnetised and readjusted. Lowest prices quoted on receipt of telephones, delivery three days.—The Varley Magnet Co., London, S.E.18.

AGENTS WANTED.—Wireless valve repair business. Deal with the actual repairers. Lowest trade terms. All types repaired. A hard vacuum guaranteed. Also old valves bought for cash 6d. each, Cossors 1s. each.—M. & G., 60, Churchfield Road, Acton W.3. Telephone Chiswick 2081.

AERIAL SATISFACTION!!—Use clear reception Radio wire for your aerial, and lead direct to set. Easily fixed. Requires no insulators. Only 1s. 8d. for 100 ft. with instructions!! Useful for earthing, and 'phone extensions, and is waterproof insulated. From your dealer or post free from David Green & Son, 651 Department, Lytham.

COLLAPSIBLE AERIAL, indoor or outdoor, crystal range 10 miles valves, continental stations, fits jacket pocket. 3s. delivered. See address below.

GARNERIUM CRYSTAL AND CATSWHISKER COMBINATION. Every piece tested and guaranteed, 50 per cent. better reception. Refund if dissatisfied. 2s. 6d. post paid.—Garner, 8, Westmoreland Buildings, Aldersgate Street, E.C. [27 r

LOUD SPEAKER HORNS.—Guaranteed perfect acoustics. Enamelled Black Matt, complete with Aluminium Base for Receiver, 4s. 6d. Post, etc., 1s.—Midland Radiophone Co., Hearsall Works, Coventry. [24 r

SIXTY-VOLT BATTERIES for sale, post free, 8s. 6d. Variometers, 2s. 6d. and 4s. Headphones, 9s.—Charles Ludlow, South Darenth, Dartford, Kent. [25 r

12/- CRYSTAL SET 1-VALVE AMPLIFIERS.—Weak signals strengthened enormously. Numerous Testimonials received.—D. Walters, 23, Machell Road, London, S.E.15. [4 s

AMATEURS SELL PARTS and Sets to friends in spare time. All makes. Stamp, Voxciel Co., 17, Queen's Hill, Newport, Mon. [5 s

PAINTED WOOD AERIAL POLES, 2¼ in. dia. (New). In 3 sections, coupled together with sockets, 29 ft. 3 in. high. 10s. Extra length, 9 ft. 9 in. long, 3s. 6d. Copper Aerial Wire, 1s. 10d. 100 ft. Galvanised Aerial Wire, 1s. 4d. 100 ft.—Byefield, Chester Rd., Warrington. [33 r

USE EARTHIA around your Earth, 4s. lb.—A. Hillman, 125, Chapel St., Tiverton, Devon. [6 s

SUPER STRAIGHT CIRCUIT giving perfect reception, clear and dominant without distortion on Loud Speaker with 2 valves, using indoor or outdoor aerial. Cheap and simple design. Drawings and full instructions for home construction, post free, 2s. 6d. Included free particulars of novel and most efficient indoor frame aerial, can be fitted, cheaply anywhere.—W. G. Dewsbury, 60, Queen Victoria Street, London, E.C.4. [30 r

S.T. 100. Complete in enclosed mahogany cabinet, £7. Heard any evening.—Day, 4, Fortnam Rd., N.19. [1 s

ADVICE ON CHOICE OF SET, aerial, earth system, addition of amplifier to crystal or valve sets, H.F. or L.F. Diagram of efficient one valve set, values of various components marked against each. P.O. 2s. 6d. to Capt. H. E. Smithers, 6, Kirkstall Rd., Streatham Hill, S.W.2. [2 s

MAKE YOUR OWN COILS. Former, 23 spokes each side, 2-inch hub. 1s. 6d. Post free.—W. Horsfall, Hallroyd, Todmorden, Yorks. [3 s

PARCHMENT PAPER specially prepared for pleated diaphragm loud speakers as described in "Amateur Wireless." Sufficient for two 12 in. 1s. 6d.; 15 in., 1s. 9d. post free.—Turpin, c/o Gerrard Radio Stores, 15, Little Newport Street, W.C.2. [3 s

ACCUMULATORS 2 v. 20 a. 3/- each.—Bowler, 78, Liverpool Road, Stoke-on-Trent.

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Those Mullard H.F. and L.F. valves make such a wonderful difference. **You could almost thank them for the splendid enjoyment they give.**

You are going back to all that makes life worth living: a welcome meal, your armchair, your pipe, and then the pure joy of broadcasting concerts.

If you have not yet experienced the wonderful difference these Master valves make in your radio reception, purchase them on your way home to-day and complete the pleasure of your winter nights.

Mullard H.F. Red Ring Valves for—
H.F. AMPLIFICATION AND DETECTION ... 12/6 each.

Mullard L.F. Green Ring Valves for—
L.F. AMPLIFICATION ... ... 12/6 each.

These valves only require a 4-volt battery.

Ask your dealer for leaflet M8 and avoid accidents to your valves by using the Mullard Safety Disc, free on request. Send us his name and address if you cannot get what you want and we will supply his requirements.

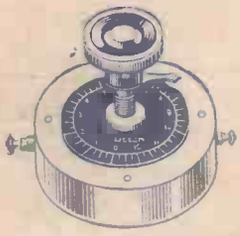
Mullard

THE · MASTER · VALVE

Advt.—The Mullard Radio Valve Co., Ltd. (A.W.), Nightingale Works, Nightingale Lane, Balham, S.W.12.

LISSENIUM

A delightful condenser to use—



A SQUARE law condenser is a necessity for laboratory work where painstaking accuracy is essential, and if a receiver were to be used on one small band of wave-lengths it would be possible to select a suitable square law condenser which would be satisfactory within its limits. The difficulty is, however, that a square law condenser which is suitable for short wave work is hopelessly inadequate for longer wave-lengths, and, conversely, a square law condenser which is suitable for high wave-lengths is totally unsuitable for short wave work. With the numerous stations in this country and all over the world now transmitting on widely separated wave-lengths, we consider it highly desirable that one condenser should be equally appropriate to all wave-lengths. We have, therefore, aimed to produce a condenser which has almost the accurate characteristics of a square law condenser, but which is much easier to tune with, provides a negligible minimum capacity at one extreme of the scale, while at the other extreme it provides a high maximum. In this condenser there has been found one which **FOR ORDINARY WORK OUTSIDE A LABORATORY IS A GREAT IMPROVEMENT ON ANY SQUARE LAW CONDENSER. THE ONE CONDENSER COMBINES ALL TUNING CAPACITIES—AND IT IS ESSENTIALLY A LOW LOSS CONDENSER.**

TUNING ON SHORT WAVE WORK IS DELIGHTFULLY EASY—LONG DISTANCE WORK IS IMMENSELY IMPROVED

The pointer of this condenser makes two revolutions —when small changes of capacity are required you work on the first revolution, and on the second revolution when more critical changes of capacity are desired—ONE KNOB CONTROL, too.

With a negligible minimum capacity, its maximum is rated at .001, but actually is higher, **THIS LISSEN MARK II MICA VARIABLE CONDENSER** (pats. pending) is WORTH ITS PRICE OF - - - - - **17/6**

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It is worth while fitting LISSEN FIXED CONDENSERS, too —made with scrupulous care— they are accurate to 6 per cent. —they never vary—never leak— THEY DELIVER ALL THEIR STORED UP ENERGY ALL THE TIME.

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When you know that every vital part in your receiver is pulling strongly with each other, you know that you have a receiver which is the best you can ever get. With all LISSEN PARTS you will get results which would never be possible with mixed parts.

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