

THE NEWEST OF LOUD-SPEAKERS

Amateur Wireless

And Electrics

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Price 3d

PRINCIPAL CONTENTS

THE COMMUNAL
AERIAL

THE MOON AND
LONG-DISTANCE
RECEPTION

DISPENSING WITH
THE HF. VALVE

THE ART OF TUNING

USING THE
THOUSAND-CIRCUIT
BOARD

5 QV

EXPERIMENTAL
TRANSMISSION

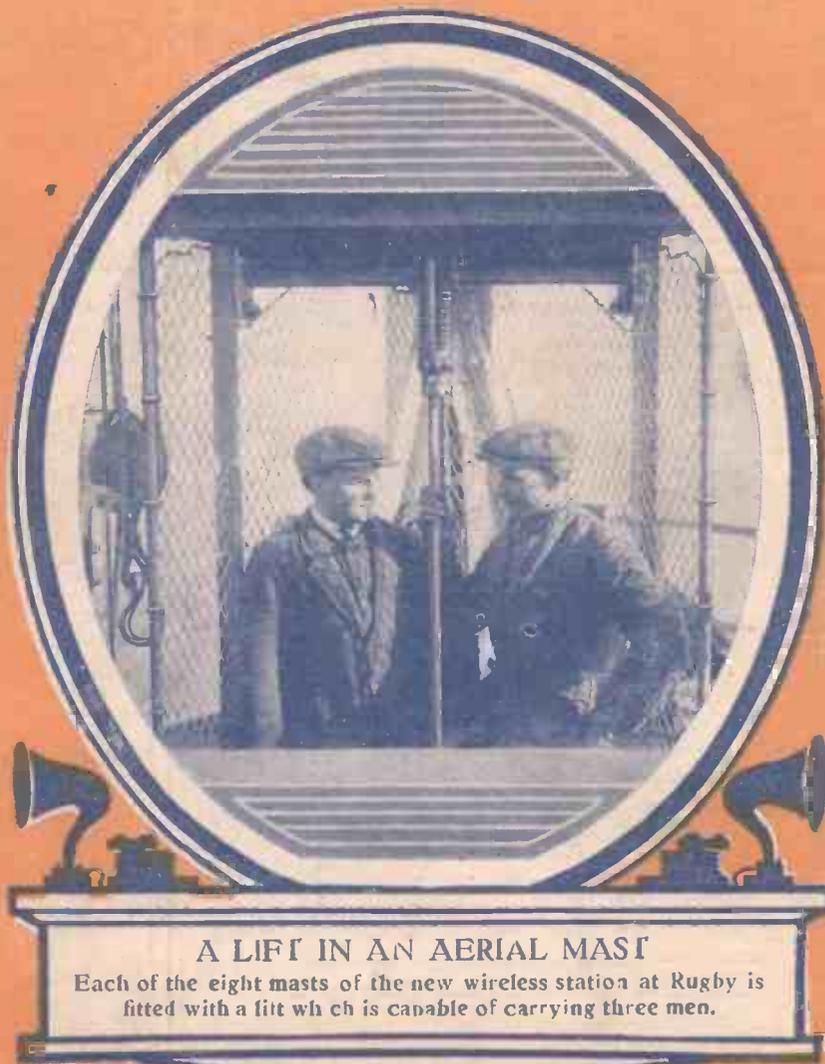
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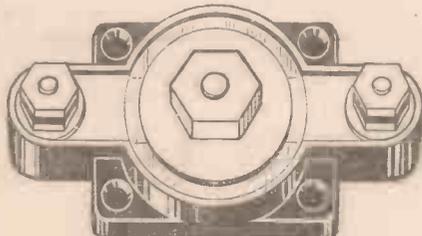
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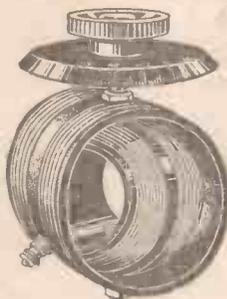


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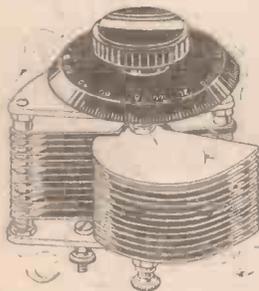
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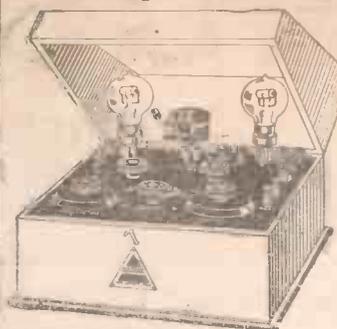
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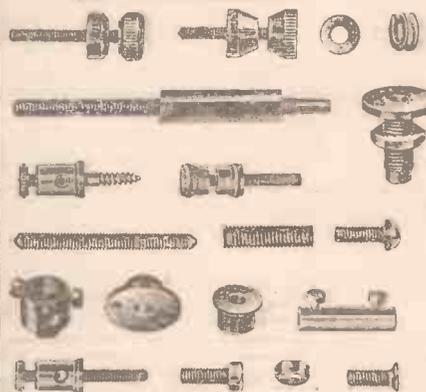


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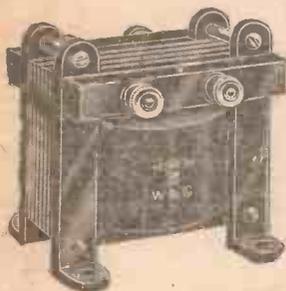
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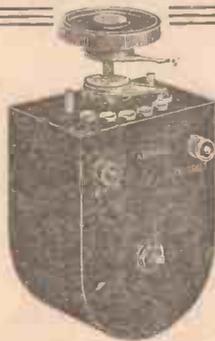
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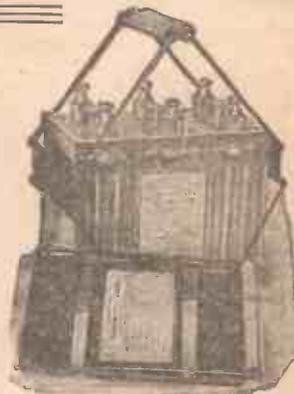


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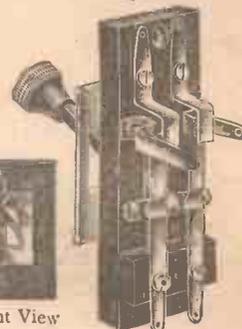


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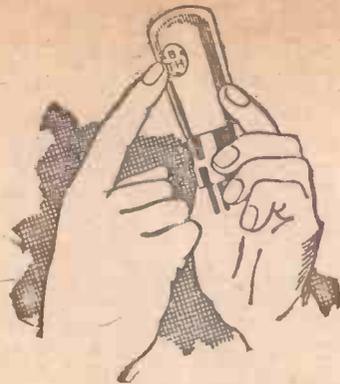


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Amateur Wireless

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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. KDKA has been used for short-wave work and WBZ for long-wave work, with occasional reference to WGY and WFY.

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

tinuity 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 WGY 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.

A simple yet effective means of retaining the selectivity of the original reaction circuit and still using the same reaction coupling, although dispensing with the valve, is to plug into the valve holder a small con-

denser 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

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

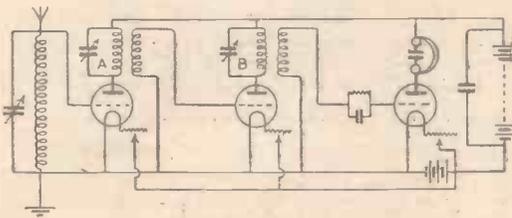
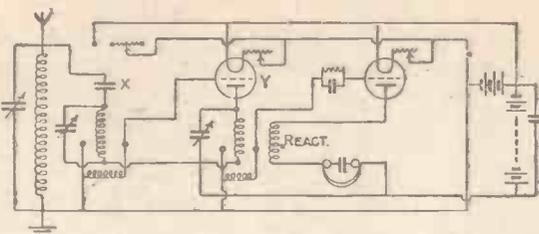
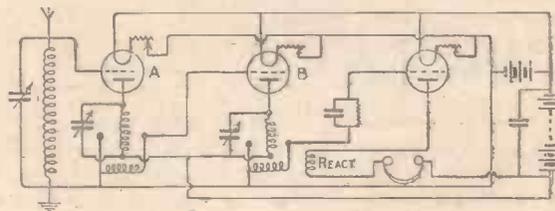


Fig. 1 (left).—Diagram showing Tuned Circuits.

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

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



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

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—airial, earth and telephone—should also be gone over to see that all are O.K.

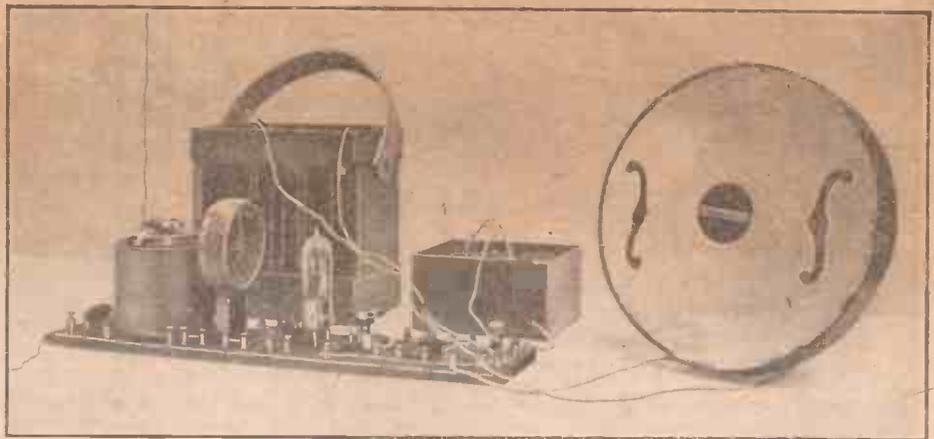
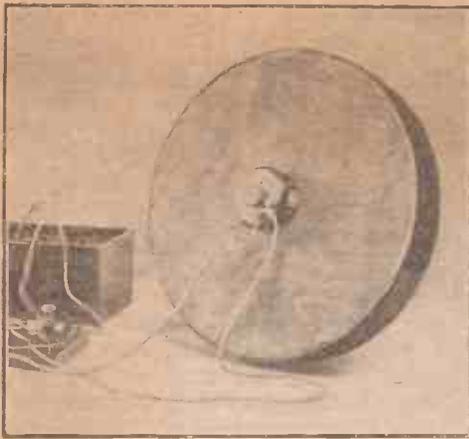
Then the valves can be lighted, always bearing in mind that in doing so the knobs of the resistances should be moved round gradually and that there is no advantage to be gained by having the valves too bright. The best point is frequently reached before the current allowed to pass to the filaments is 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 screw-driver.

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 ¼-in. pine wood if this is available. The author, however, was unable to obtain pine and had to be content with sycamore ⅜ 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 cross-piece. Two nuts placed on the rod are so adjusted, back and front, that the relative positions of cross-piece and phone are correct.

A. J. C.

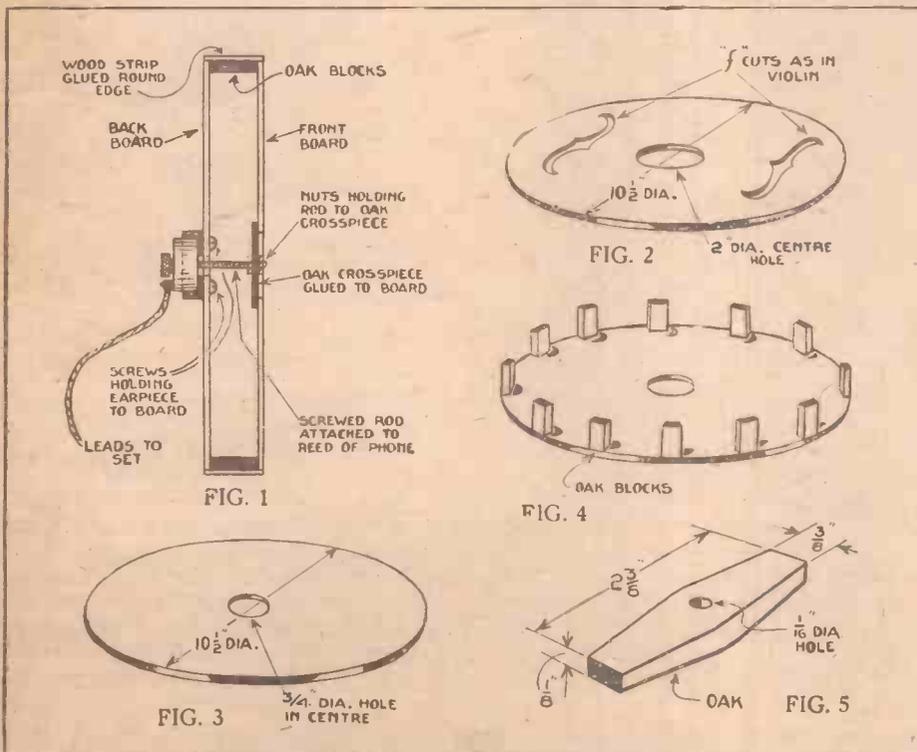


Fig. 1.—Section of Loud-speaker. Fig. 2.—Front Board. Fig. 3.—Back Board. Fig. 4.—Arrangement of Side Blocks. Fig. 5.—Oak Cross Piece.

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 R_g 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 R_g .

The counterpoise, as already stated,

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 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.

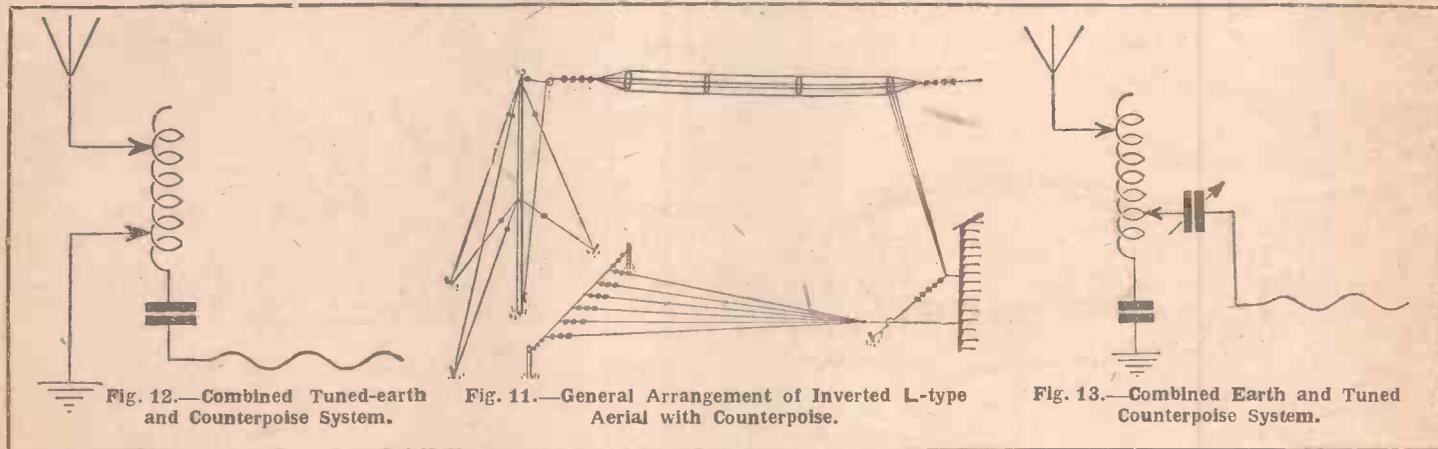
The essential points about direct earths are: (1) An extremely large surface must be presented to the ground if a large value for the aerial current is desired; (2) the surrounding soil must be kept very moist to ensure good contact; (3) all joints must be soldered and the lead-in from the earth should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

Where a really good direct earth is

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.



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 it is greatest in the earth lead. Stranded

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

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 aeriæls.
- (2) Aeriæls for duplex work.
- (3) Artificial, phantom or dummy aeriæls.

KENNETH ULLYET.

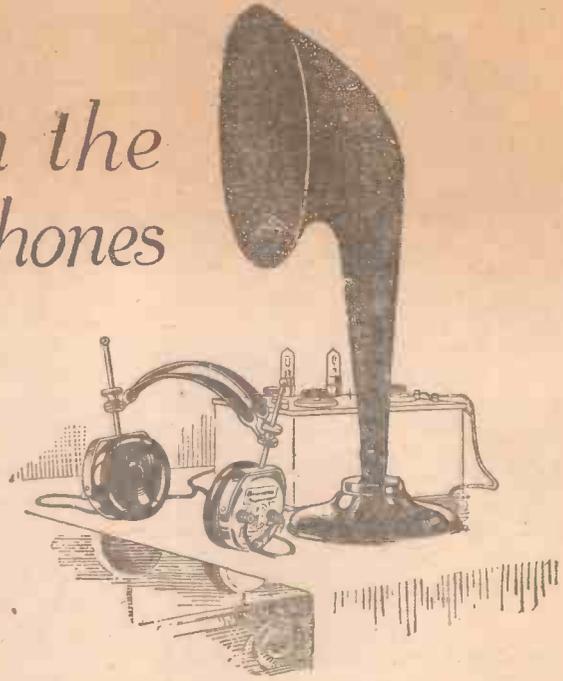
(To be continued)

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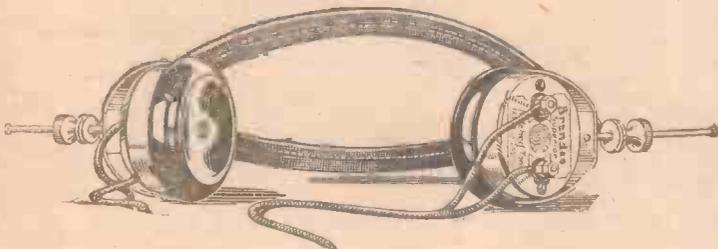


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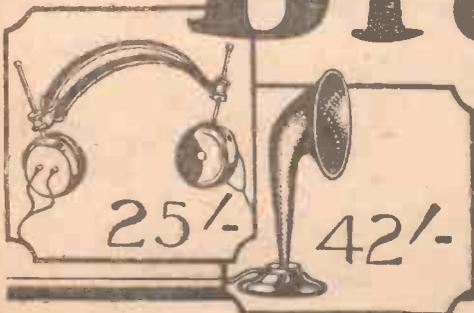
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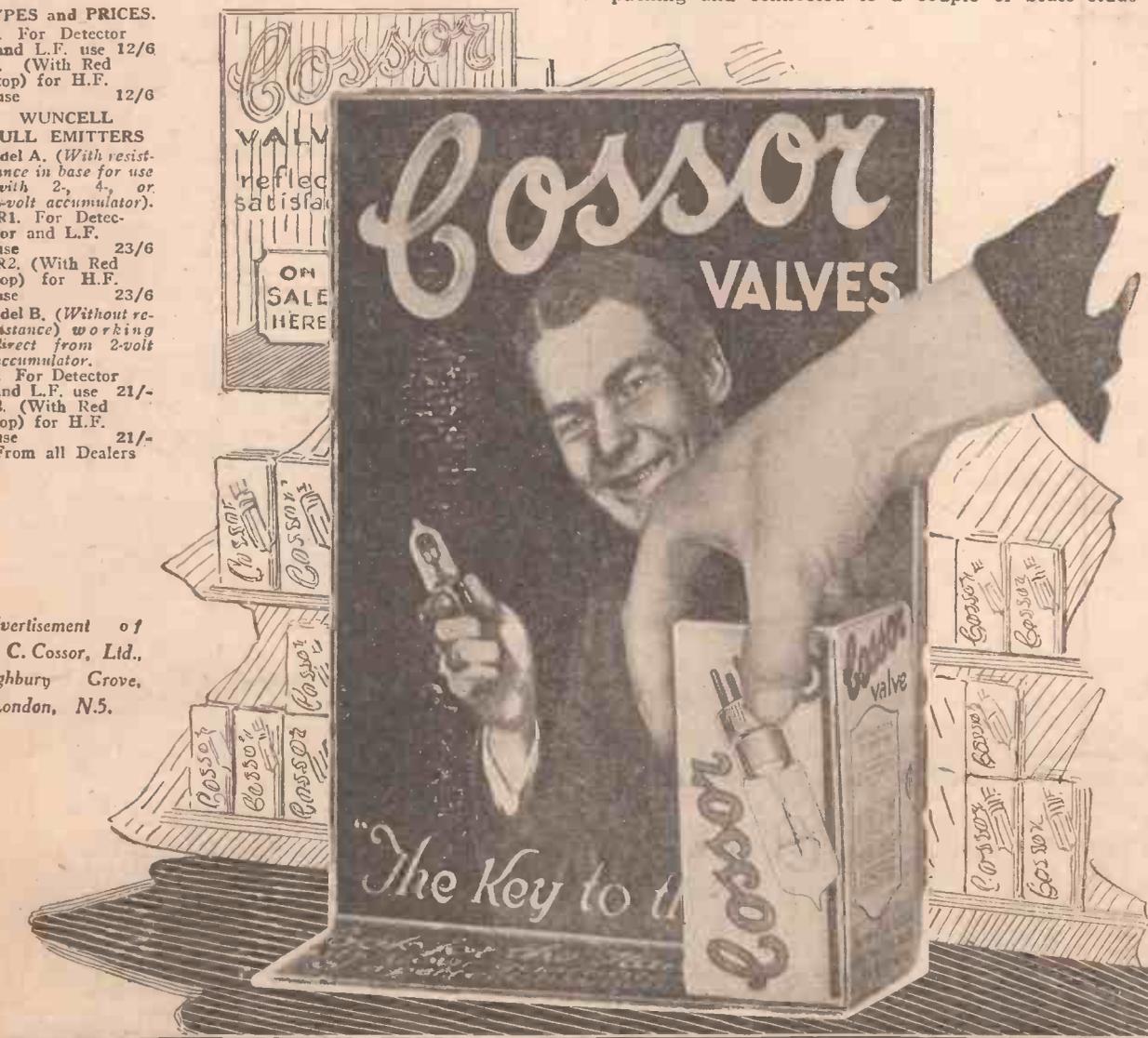
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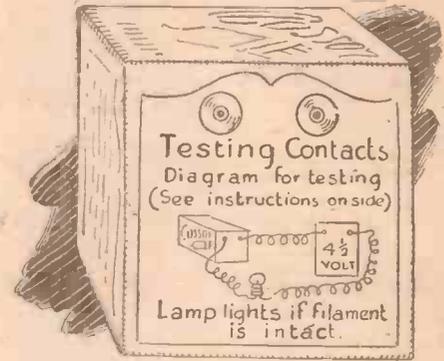
Valves

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.

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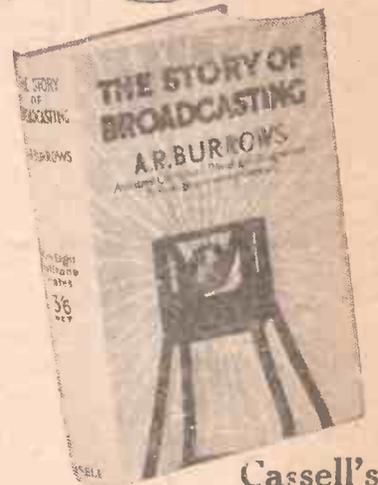
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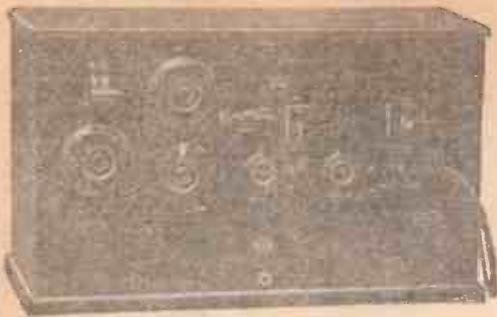
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On Your Wavelength!

The Jamming Question

I HAVE had an interesting letter from a correspondent who takes exception to my remarks on the difficulty of separating 5 XX from Radio-Paris. I said, if you remember, that though I could tune in 2 ZY on 375 metres so that there was no interference from 2 LO on 365, I could not get rid absolutely of 5 XX 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 ZY and 2 LO than between 5 XX 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 LO from 2 ZY than 5 XX 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 LO's Birthday

By the time that these notes are in print 2 LO 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 LO 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 LO'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

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On Your Wavelength! (continued)

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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 lozgette 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 kolovolts and volokilts, until finally he got so tired 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 recognition. 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 2 L O 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 caviars 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

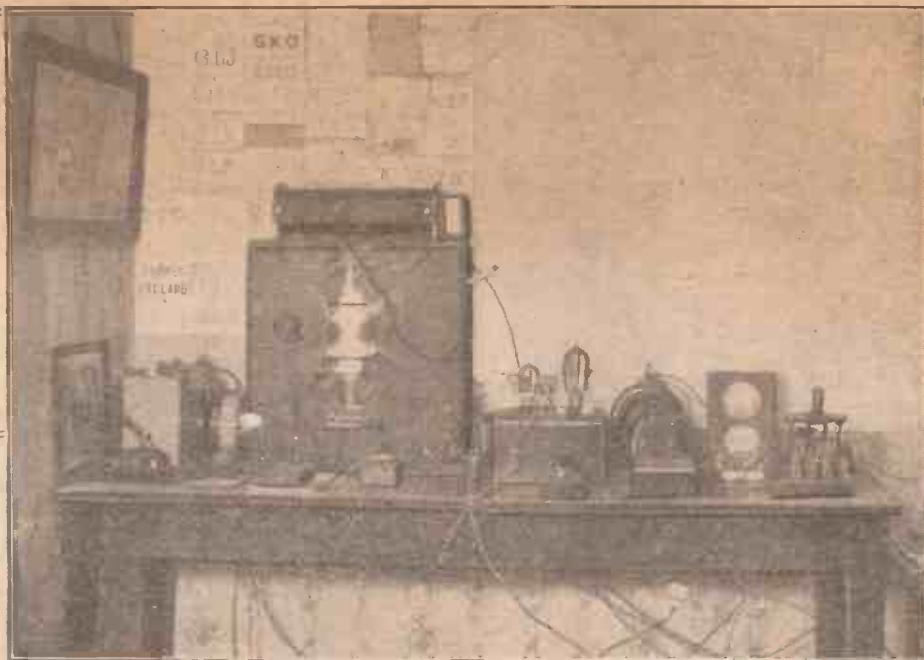
I have endured many public processions in my time, but this year, thanks to wireless, I actually enjoyed one! And no less than the Lord Mayor's Show at that. By hearing it first and seeing it later (yes, on the pictures!). I had all the excitement and thrill of the noise and blair, without the physical 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 aërials 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 aërials 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 aërials 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

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.

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 NBA, 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)



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

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

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

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 resist-

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.

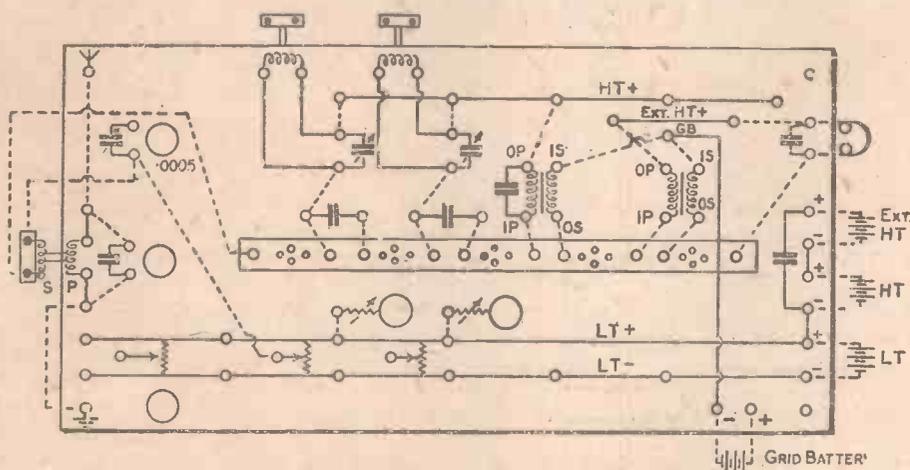


Diagram showing the Board as a Five-valve Receiver.

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.

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-

ances, 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

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.



How does it magnify?

AS a matter of fact, it *doesn't* although most people think of it in that way. The wireless valve is a valve in the truest sense of the word; just as much as the throttle on an engine. It is there to regulate the supply of energy from your H.T. battery in obedience to impulses from the aerial. The energy so regulated transforms the feeble current picked up from the ether into sounds

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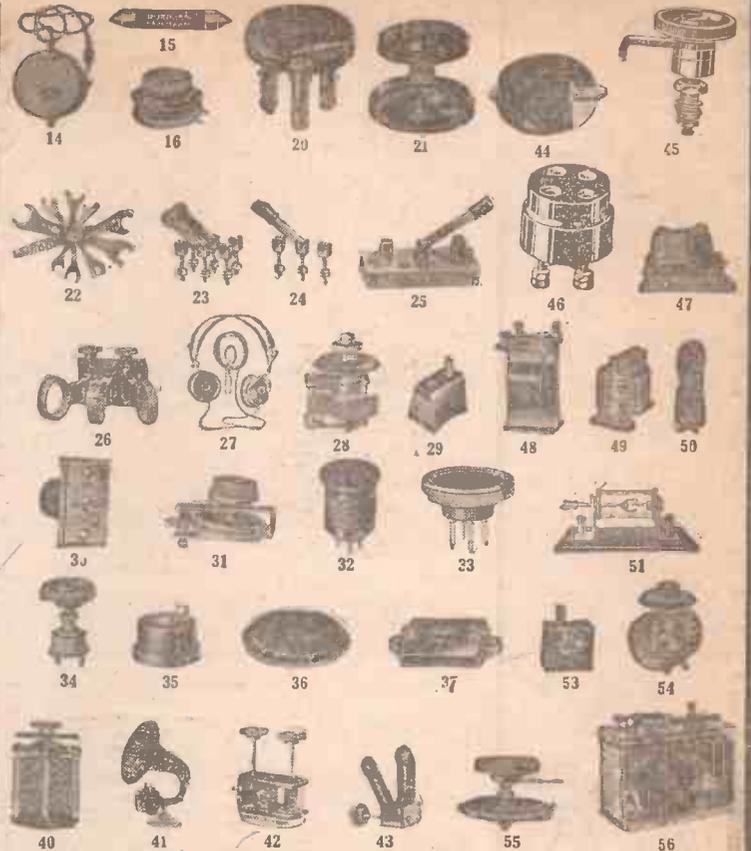
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No. 3. 450-1200	4/3
No. 4. 900-2000	4/6
No. 5. 1600-3000	4/9
No. 6. 2200-5000	4/11

CALLERS' PRICES ELSEWHERE

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/-
Igranite, 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	14/8
Raymond	10/-
Eu'ecka 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/-
Do. with dial	1/6
Raymond	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/-
Ergo, 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	
Cosar	P.1 "
Cosar	P.2 "
Myers-Universal	
Xtraudion	
Mullard H.F. (Red Ring)	
Mullard L.F. (Green Ring)	

DULL EMITTER POWER VALVES

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

"J.B." VARIABLE CONDENSERS

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

SQUARE LAW

.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 -

All Valves on post sent at Purchaser's risk.

25/- each	Type
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
Marconi-Osram D.F.E.5	35/-
Mullard	D.F.A.1 35/-

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

.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 -

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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.



'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,
says: Millom.
Your Condensers are a REVELATION to me as a Dealer. Sept., 1924.
C. Walton, Esq., Andover.
Tested your Condensers on Megger and got "INFINITY."

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

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Callers Only (These 3 Columns)
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- 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 whisks (one gold) 2d.
- Easi Fix cups 1d. and 1 1/2d.
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- 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
- Izganic, T.C.B., and all known makes.

- Good Coil Plugs from 4 1/2d.
- Edison Bell Shaped 1/-
- Raymond ditto 10 1/2d.
- Basket Adapters 8 1/2d.
- Also at 1/- & 1/3
- 2-Way Coil Stands 2/6
- With Extens. Handle 2/11
- Also at 3/6, 4/-, 4/6
- 3-Way 4/3, 4/6, 5/-
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- Franco " " 12/6
- Polar " " 11/-
- Etc., etc.
- Coil Plug on Stand ... 1/-
- Ditto, Swivel Movement 1/3
- Coil Plug and Clips 6 1/2d.
- Microstat 2/6
- Tumbler Switches
(Ebonite) 1/4
- Fibre Strip (for Coils)
3 feet 2 1/2d.
- D.C.C. Wire, per 1/2 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.
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- Nickel Contact Studs
2 for 1d.
- Nickel Switch Arm 1/-
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- Loading Coil and Plug 8d.
- Garnages 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, 10d.
.002, .003, .004 1/-
.006 1/3; .01 1/9; .02 1/9
- Polar Micrometer
Condenser 5/6
- W.O. or Pillar Terminals 1d.
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- Phone 2 B.A. 2 for 2d.
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- (Above with Nut Washer)
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- Pin Screws..... 2 for 1d.
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- Spring Pillar Terminals 2 1/2d.
- Nuts, 2, 4, 5, 6 B.A. doz. 2d.
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- Min. Panel D.P.D.T. 1/-
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Extra with Clips ... 2/6
Ebonite 3/9, 4/6, 5/11
About 16 various Designs
No Rubbish

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15 feet 5d.
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12 feet 5d.
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- 7/22 Copper Aerial,
100 feet 1/10 1/2
- Extra Heavy Aerial
100 ft. 2/- & 2/3
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- H.F. Transformers ... 2/9
- Empire Tape, 1/2 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 2 1/2d.
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- Waxless (5) 200/2,000,
set 1/8
- Waxed (6), 200/3,600
set 1/8
- Waxed (7), 150/3,600
set 1/9
- Chelmsford No. 8
Tandee 1/-, 1/6
- Chelmsford, D.C.C. 1/3
- 1 Complete with Adapter 2/3
(To use with variometer.)
- Allen var. Gd. Lk. 1/3
- Allen Anode Res. 1/3
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- Twin Flex 4 yds. 6d.
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- Do. Aux. Res. 1/3
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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
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.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 New-est Model 27/6
- Junior De Luxe Oak
Trumpet 42/-
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Value 55/-
- Dragon Fly, Baby Am-oliva 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
2 v. 40 amps. 9/6. Post 10/6
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4 v. 60 amps. 19/6. " 20/6
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6 v. 60 amps. 27/6. " 29/-
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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

EBONITE, 3/16-in.

- CALLERS' PRICES.
6 x 6 1/4
7 x 5 1/4
8 x 6 1/10
9 x 6 2/-
10 x 8 3/-
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12 x 12 5/6
14 x 10 5/6
CUT TO SIZE, 1d. sq. in.
WE STOCK 1/2-in. EBONITE.

SHAW'S HERTZITE BEATS ALL OTHER "ITES" 1/-

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

Our Wonderful H.T. BATTERIES NO POST ORDERS

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- 60 v. B.B.C. 5/6
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- 9 v. B.B.C. 2/6

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CLARKE'S ATLAS SPECIALITIES

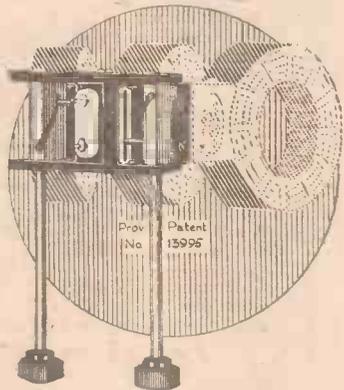
Before making the Wireless Set you have in mind, ask your dealer to show you the range of Clarke's "ATLAS" components. Designed by experts, made by skilled work-people, carefully tested, and thoroughly guaranteed, it is impossible to get greater value or more dependable components.



FIXED GRID LEAK & CONDENSER.

The condenser casings are made of strong Bakelite, and only the very best copper foil and the finest Ruby Mica as the dielectric. Not only is the condenser of the actual capacity named, but the capacity is kept absolutely constant. The leak is encased in neat ebonite tubes, the ends of which are surmounted by brass nickel-plated caps, also fitted with our latest pattern of bracket-cum-soldering tag.

All values supplied both of leak and condenser. Condenser tested to 1,000 volts. Prices from 3/6 each.



COIL STANDS.

The illustration shows the "Atlas" patent micrometric adjustment, which yields a perfectly even slow motion, and prevents the falling over of the moving coil. Gives an accuracy of tuning which is a delight. There is no fear of "missing" carrier waves owing to a too quick movement of the coils. Mechanically and electrically sound in design, these coil stands are made and guaranteed by experts, and are sold at surprisingly moderate prices.

Made in both two- and three-way patterns, and fitted with neat tension adjustment.

Two-way pattern, 8/9 each. Three-way pattern, 11/- each.

Say "ATLAS" and be safe.

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Phones: 683 & 793 Trafford Park

Grams: "Pirtold, Manchester."



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Phone: CITY 2972. (One door from Queen Victoria St., and Queen St.)

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ACCUMULATORS IN STOCK CHARGED

2-volt, 40 amp. . . .	9/6	Charged
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4-volt, 40 amp. . . .	16/6	
6-volt, 60 amp. . . .	26/6	

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**SPECIAL L.F. TRANSFORMERS . . . 10/- EACH.
EVER-READY H.T. BATTERIES.**

A Combined Soldering Iron & Blowpipe.



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POST FREE**

Specially designed for the Wireless Mechanic.

The "Mystic" Combined Soldering Iron and Blowpipe is attached to an ordinary flexible gas tube and works for you at **75% LESS COST THAN ELECTRICITY**. Only 7 1/2" long, it is fitted with a neat, solid copper hammer bit which heats to soldering point in less than one minute and retains a constant and uniform temperature. By un-crewing the bit, you have a powerful Blowpipe. Money returned if not absolutely satisfactory.

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This crystal set has operated loud speaker (with no amplification) 5 miles from 2 Z Y. Satisfaction guaranteed. **ONE-VALVE AMPLIFIER** to fit in the phone compartment of this handsome set **£3.3.0**
Works L.S. efficient ten miles from B.B.C. station. Let us send you full particulars.

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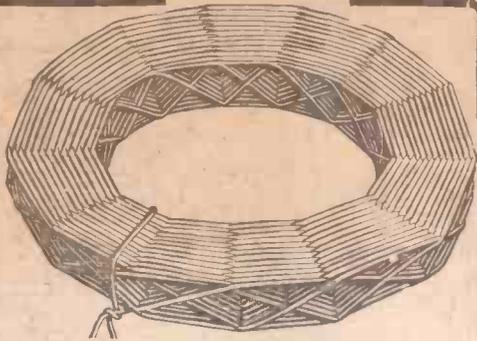
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Supplied in sets of 5 (Nos. 25, 35, 50, 75 and 100), and each set is boxed. Be sure to see the name "Reactone."

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Highest Efficiency Coils are TENSION WOUND

Each Reactone Coil, besides having a special formation to yield maximum air-space, is wound by special process under a constant tension.

A Coil is thus formed that is absolutely standard and true to calibration. Also extreme rigidity is attained without the use of shellac or wax.

You therefore get an inductance that is practically free from self-capacity, and thus gives louder signals, sharper tuning and readier reaction, besides being rigid and unvarying.

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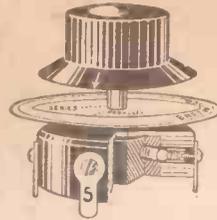
TENSION-WOUND
Inductance Coils

Ask your Wireless Dealer. In case of difficulty send P.O. for 4/9, with your Dealer's name and address, to Sole Distributors for U.K. and Ireland.

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Manufactured by Lewis Harforth & Co., London.



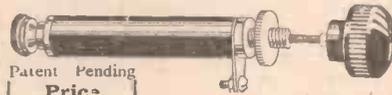
ANTI-CAPACITY SWITCH



We have pleasure in presenting another first-class speciality, which is the outcome of the famous BRETWOOD ANTI-CAPACITY VALVE HOLDER, which has gained such popularity among the wireless public on account of its scientific design and smart appearance. The Bretwood Switch is constructed on similar lines and we claim that it is like the Valve Holder, absolutely free from capacity effects, and we feel confident that this component will meet with the most exacting requirements of the present day experimenter. One of the principal features of the Bretwood Switch is its beautifully smooth action, made possible by the spring loaded balls, and the wiping or rolling motion of the Phosphor-Bronze balls always insures clean and perfect electrical contact.

Features.—1. Absolute freedom from capacity. 2. Perfect contact. 3. Sweet and smooth action. 4. Practically no wear and tear. 5. First-class finish and neat in appearance. 6. Easy to fix (one-hole fixing). 7. Very easy to make wire connections. 8. Like our other components it is fully guaranteed. 9. For value offered the price is moderate.

Price
5/-
postage
3d.



Patent Pending
Price
3/-
Postage 3d.

It's the LEAK that Counts

The Bretwood Grid Leak (Guaranteed) tunes a carrier wave from the silent point up. The Bretwood is recognised by highest experts and experimenters as the only variable and reliable Grid Leak.

THE BRETWOOD PATENT VALVE HOLDER
Eliminate poor reception by adopting this scientifically designed Valve Holder, and obtain 100 per cent. efficiency. Easy to fix. No capacity. No leakage. Always perfect contact. No soldering. Can be mounted on front or back of panel. Price 3/10. Postage 3d. Visit our Stand, Section I, White City Exhibition.

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ALL BRETWOOD SPECIALITIES ARE OBTAINABLE FROM MOST WIRELESS DEALERS.

Barclays 327.

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The Pioneers of Cheap Prices in the North and the Only Firm in Great Britain with actual Broadcasting Experience

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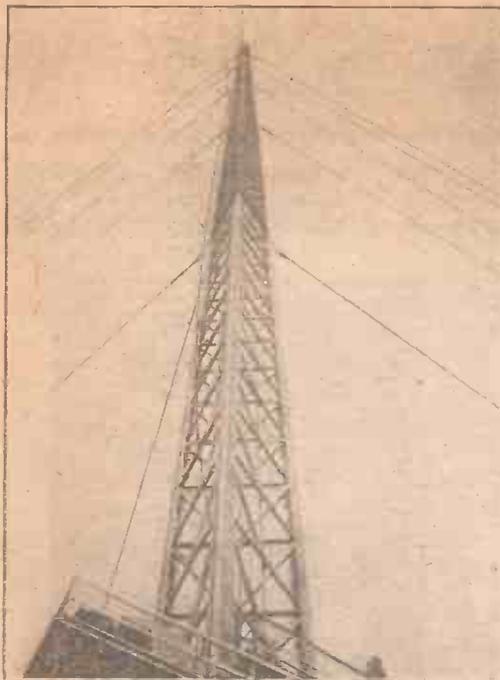
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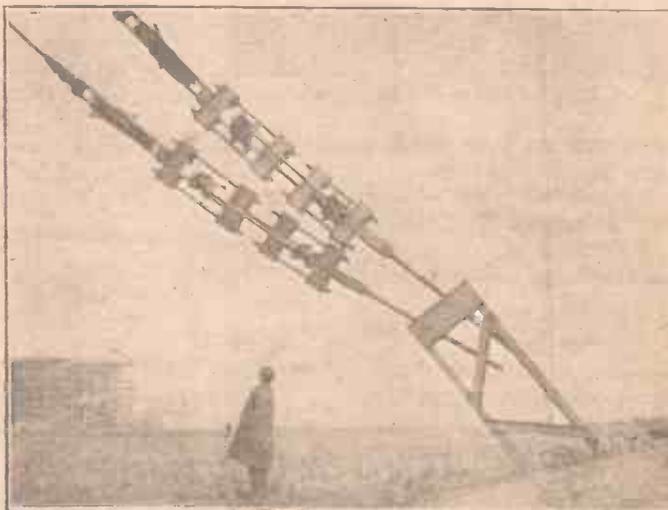
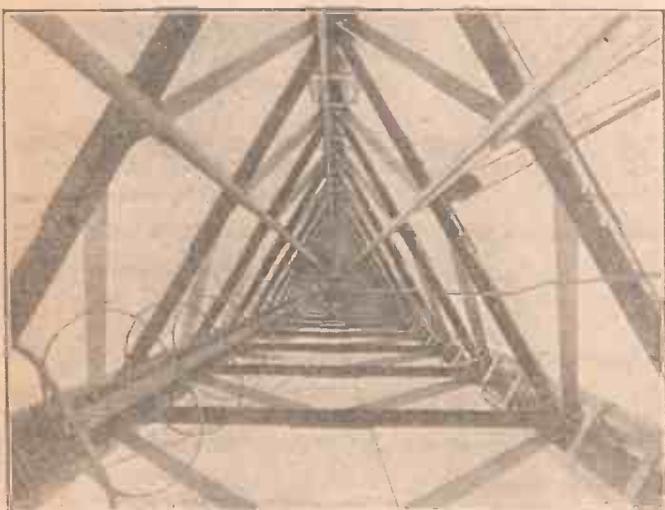
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THE LARGEST WIRELESS STATION IN THE WORLD

AT Millmorton, 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.

Ask "A.W." for List of Technical Books

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 maximum 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 bright-



Panel-mounting Valve Holder.

ness (or otherwise!) of the filament. These holders are made by V. R. Pleasance, of 60, Fargate, Sheffield. VANGUARD.

PROGRESS AND INVENTION

Single-valve Circuit

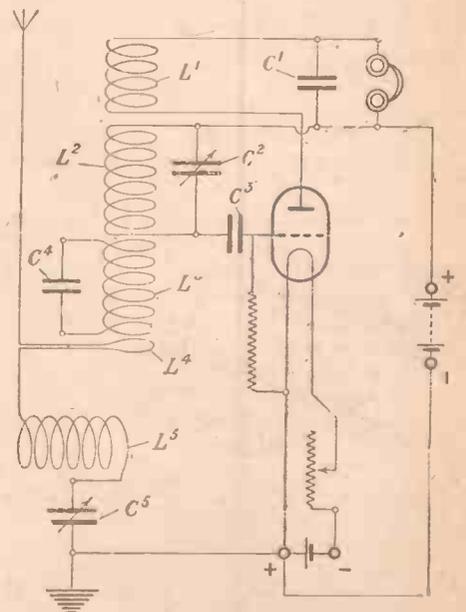
THAT it results in the maximum clarity and tone in reception with the minimum number of valves and is free from the complexity of couplings usually used in arrangements of a compound type is the claim made for a new circuit that is the subject of Patent No. 221,951/24 (Cooke and Whitfield Wireless, Ltd.,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

In the aerial circuit is included a single-turn coil L_4 (see circuit diagram) which is wound about the lower end of a periodic coil L_3 . The aerial tuning coil L_5 is placed with its plane at right angles to the plane of the coil L_3 . Coil L_3 is wound on the same former and side by side with L_2 , these being spaced apart. Coil L_3 is not tuned to the incoming wavelength.

Wire of relatively large gauge and hence of low resistance is used for winding coils L_4 , L_3 and L_5 , but fine wire can be used for the reaction coil L_1 . This is wound over the top of L_2 , but is insulated from the latter. The whole circuit is shunted by a relatively large capacity C_1 .

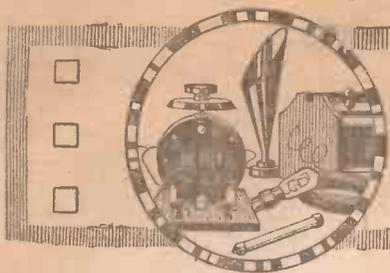
The periodic coil L_3 is inserted for the purpose of obtaining oscillation in the oscillatory circuit and to compensate for

the phase difference between the currents in the aerial and subsidiary circuits. It is found that with a circuit constructed in



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

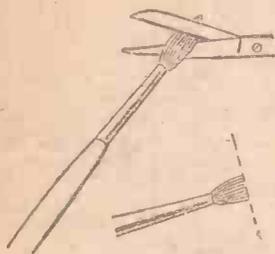
this way, with the use of one valve, excellent results are obtained.



PRACTICAL ODDS AND ENDS

Cleaning Crystals

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



Brush for Cleaning Crystals.

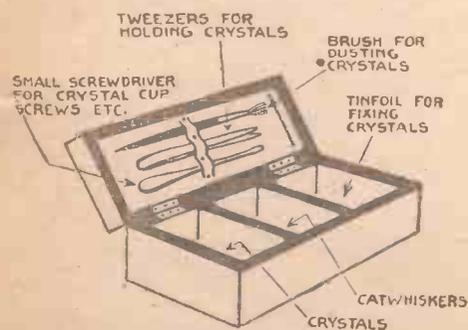
An ordinary painting brush, such as can be obtained for a few pence, can be made into a good crystal-cleaning brush by cutting off the pointed end (as shown in the illustration), a pair of domestic scissors being used for the purpose. R. N. W.

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.

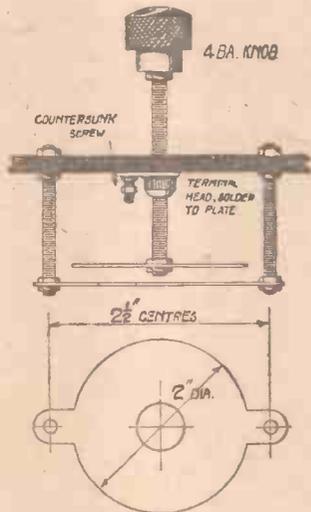
Loud-speaker Distortion

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.

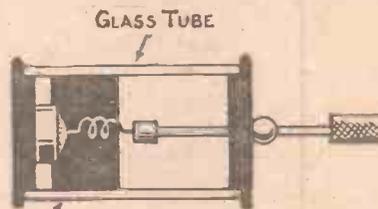
should preferably be of zinc, though aluminium, copper or brass will serve equally well. One must be circular, while the other should have lugs, as is shown in the lower sketch.

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.

Please mention "AW" when you write to Advertisers.

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



BLACK BAND
Making the Catwhisker Visible.

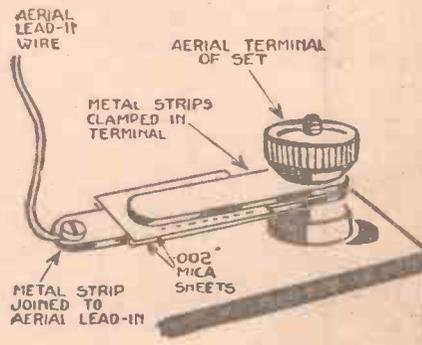
indian ink a band on half of the tube or gum on a piece of black passé-partout paper. This will make the catwhisker more visible owing to the contrasting colours of the catwhisker and black band. P. B. O.

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 3/4 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

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-AL 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.

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

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

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 give a total inductance equal to $L_1 + L_2$, whilst in-



Two Receivers

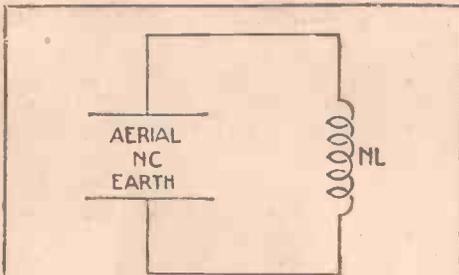


Fig. 1.—Circuit of Plain Aerial.

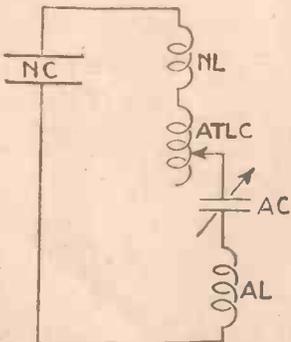


Fig. 4.—Alternative Circuit for Correct Tuning of Aerial.

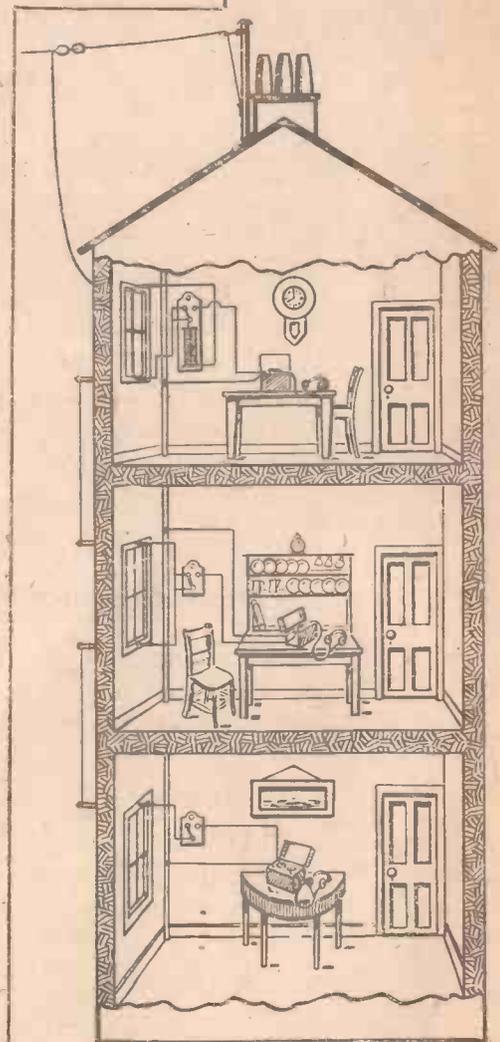


Fig. 6.—House Wired for Three Sets on One Aerial.

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.



sets 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

$$\text{Total LC} = 4 \times 1.5 = 6 \text{ LC}$$

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

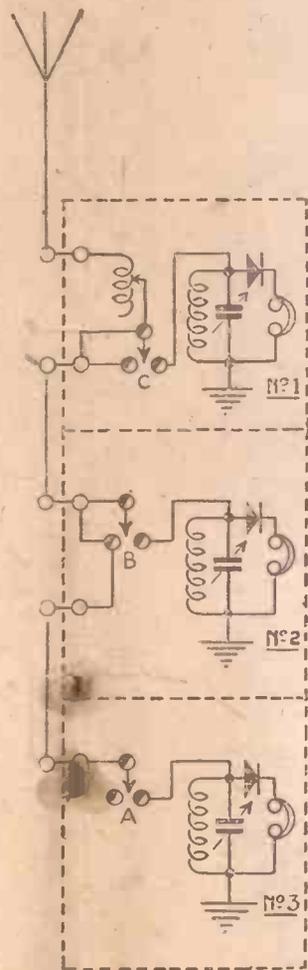


Fig. 6a.—Circuit Diagram of Arrangement Shown by Fig. 6.

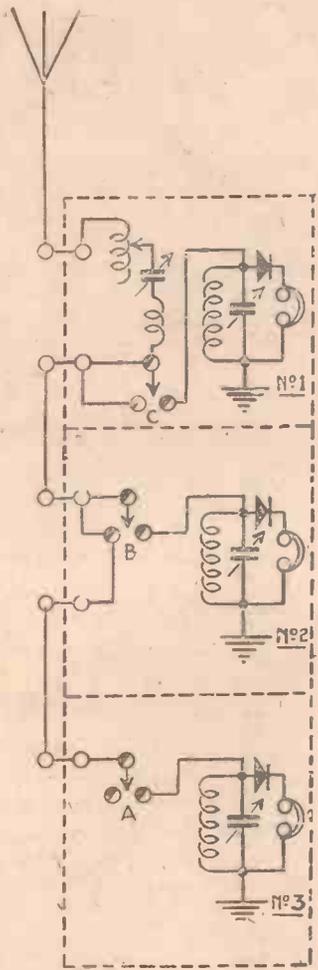


Fig. 7.—Arrangement of Additional Acceptor Circuit.

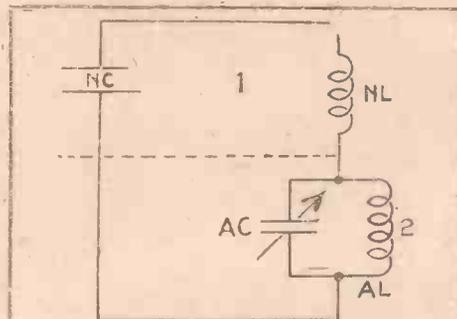


Fig. 2.—Artificial Tuner Added to Plain Aerial.

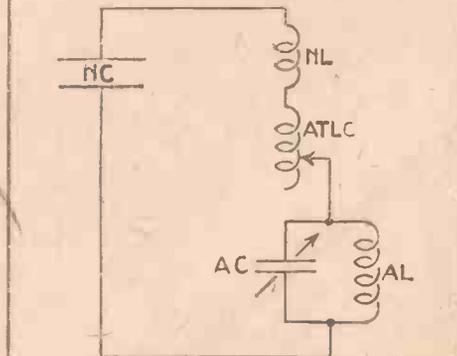


Fig. 3.—Diagram showing Method of Correctly Tuning the Aerial.

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

14 LC. It is only necessary to include the correct inductance and condenser values throughout circuit B in order to ensure correct tuning.

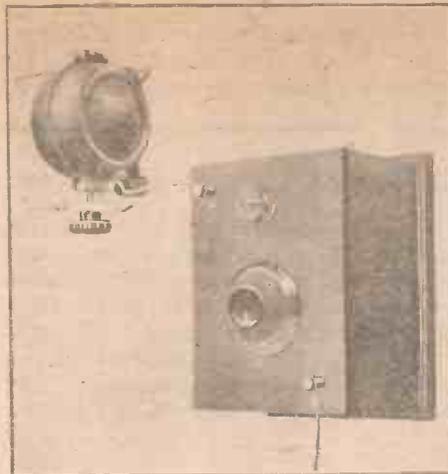
In actual practice a switch may be inserted at X in order to allow of cutting out in turn each circuit to tune the other. After once having tuned each receiver on the one aerial, further adjustments when listening-in should not be attempted.

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.

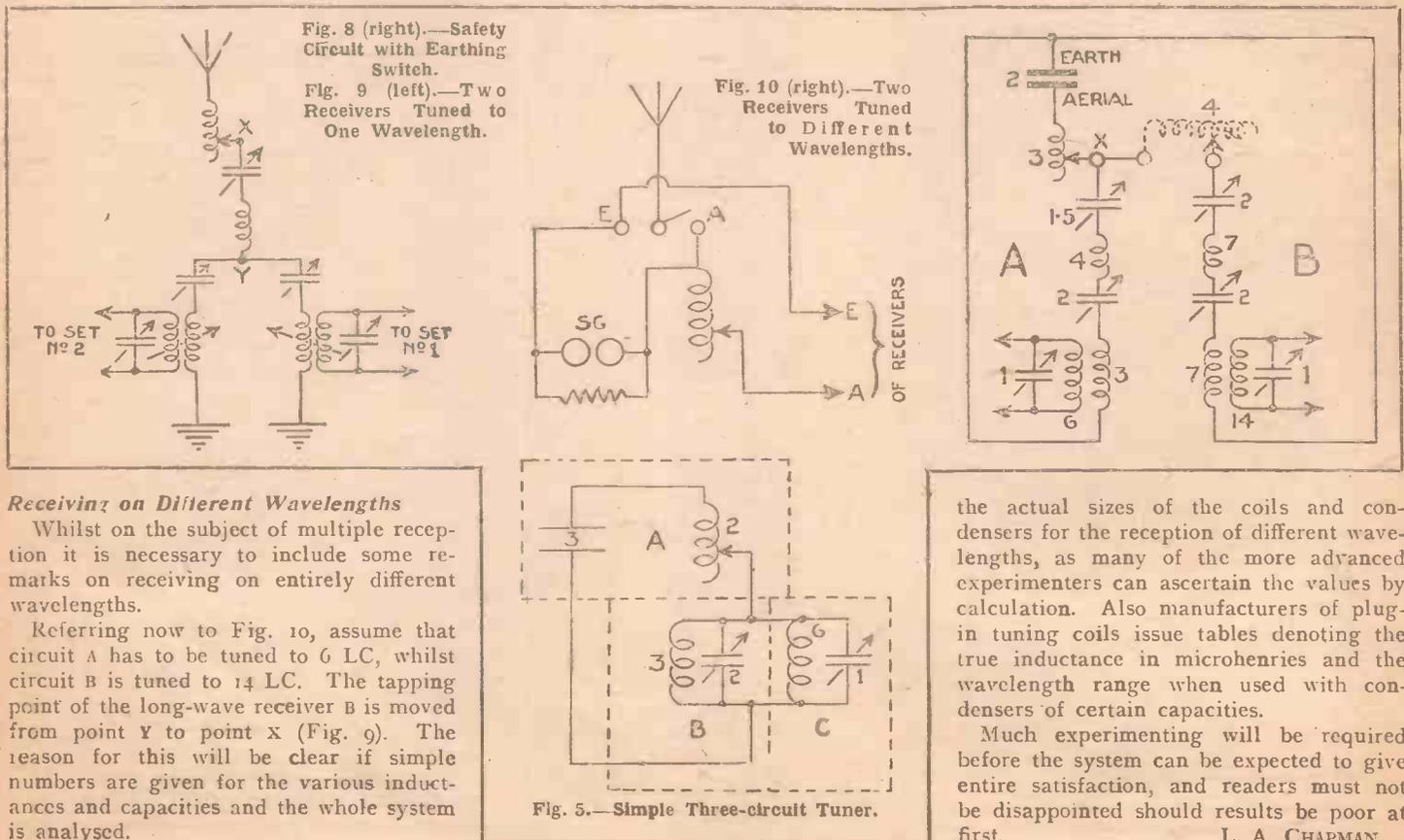
Value of Components

Nothing has been said with regard to



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,



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.

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.

5 YM'S SINGLE-VALVER

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 ease 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 microfarad 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

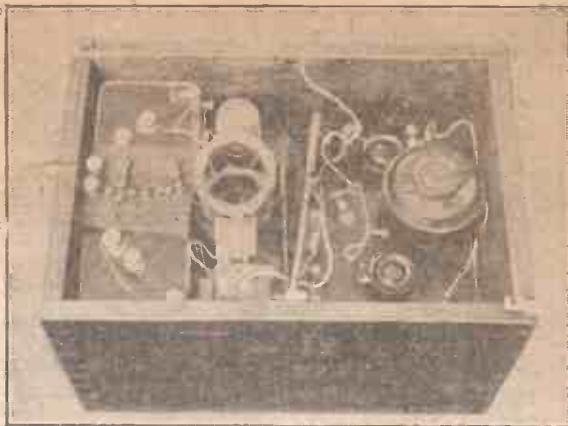
When the circuit is operated with the Flewelling switch in on an ordinary outdoor aerial, with the customary earth connection, it behaves excellently.

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

(Concluded in third column of next page)



Interior of Single-valve Set.

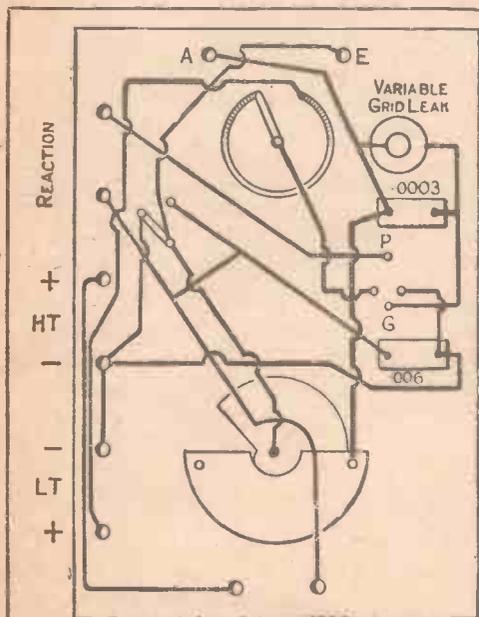


Fig. 2.—Wiring Diagram.

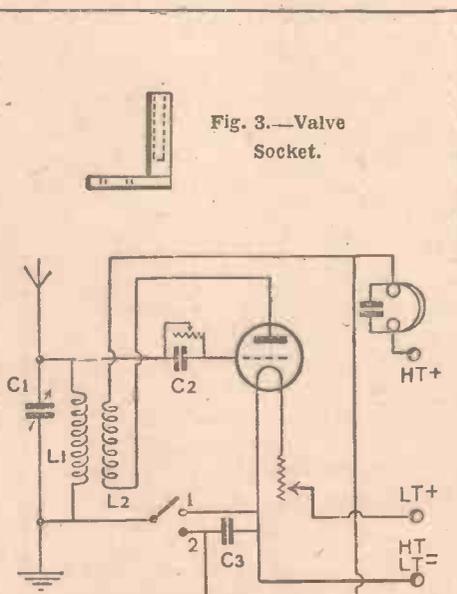


Fig. 1.—Circuit Diagram.

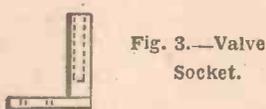


Fig. 3.—Valve Socket.

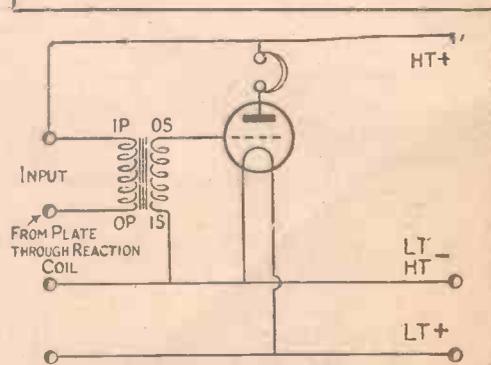


Fig. 4.—Connections of Note Magnifier.

CRYSTAL TALKS.—IV

METHODS OF CONNECTING COILS.

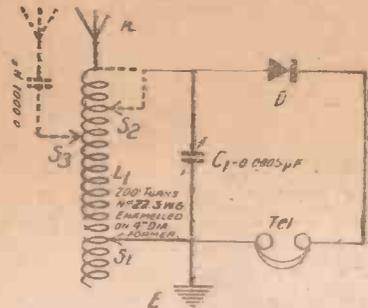


Fig. 1.—Connections for Slider Coils.

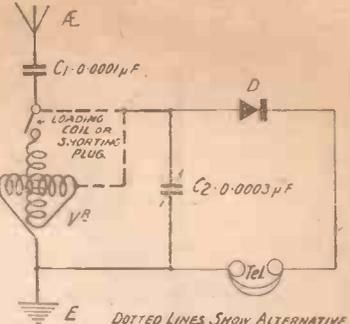


Fig. 3.—Variometer Connections.

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

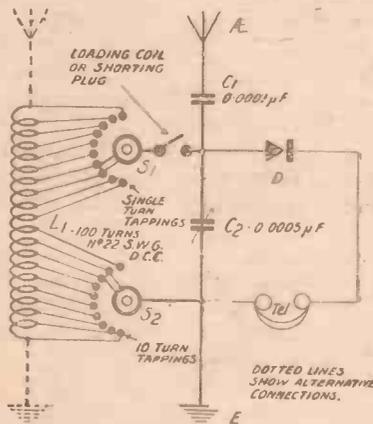


Fig. 2.—Tapped-coil Connections.

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.

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

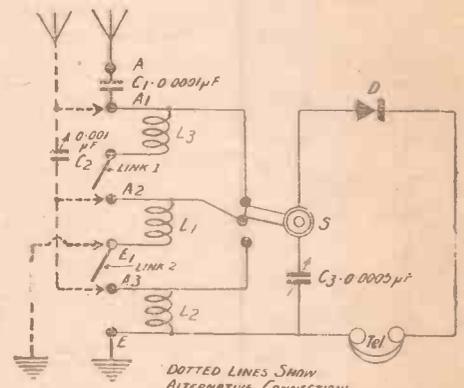


Fig. 4.—Connections for Plug-in Coils.

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.

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.

and now, Brussels...

To the wonderful record of long-distance reception with Neutron Crystal must now be added that of Mr. L. V. Clark, of Experimental Station 5BT Chiswick, London, who reports receiving clear telephony from BRUSSELS on a Neutron Crystal, without the aid of Amplifiers.



—with Neutron, the Crystal that is doubling the range of the Crystal Receiver

Sooner or later, you will use Neutron, and then stop searching for better results. You may secure a good crystal by just asking for "a crystal"; but you may also try twenty or thirty first. On the other hand, if you ask for Neutron, in the black-and-yellow tin,

you will inevitably secure optimum results *at once*—and save the expense of further tests. This was the experience of "W. T. T." Harrietsham, Kent, who writes:—"I have tried crystal after crystal, but I have never had such a good result before as I have to-day

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Ireland: Pettigrew & Merriman Ltd.,
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All the best Radio Dealers sell and recommend Neutron (in the black-and-yellow tin). If you should have any difficulty in obtaining it, send 1/6 with Dealer's name and address and this guaranteed Crystal will be mailed by return. **1/6**

See Stand D2, British Wireless Exhibition, White City, Nov. 15 to 29

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.

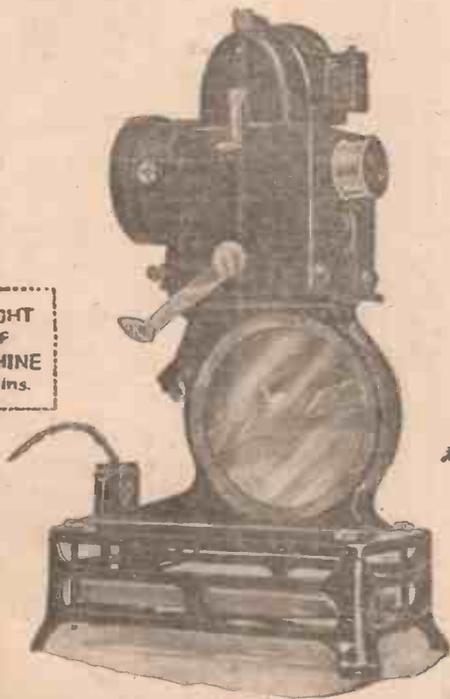
We have received from L. McMichael, Ltd., of Radio Corner, 179, Strand, W.C.2, a very interesting catalogue of a large array of wireless sets and components. A handy reference system has been adopted that enables the particulars of any part or set to be ascertained in a moment.

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

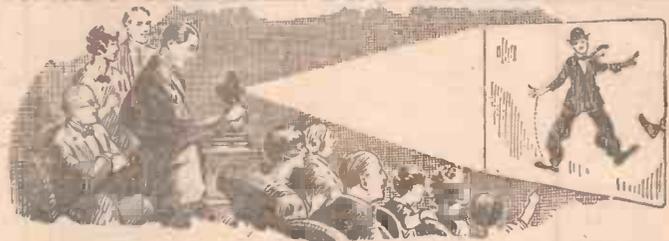
The name of Mr. Baldwin should be added to the catalogue of Cabinet set-makers.

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.

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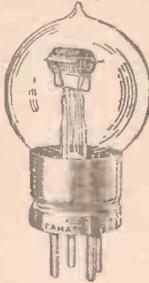
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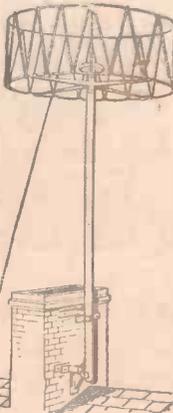
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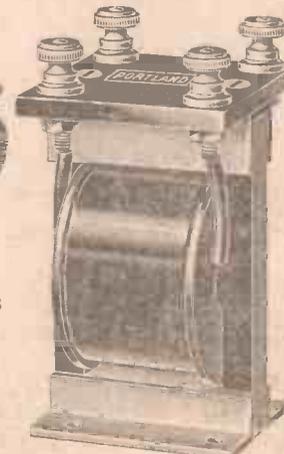
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BETTER THAN THE BEST OF THE REST

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.

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.

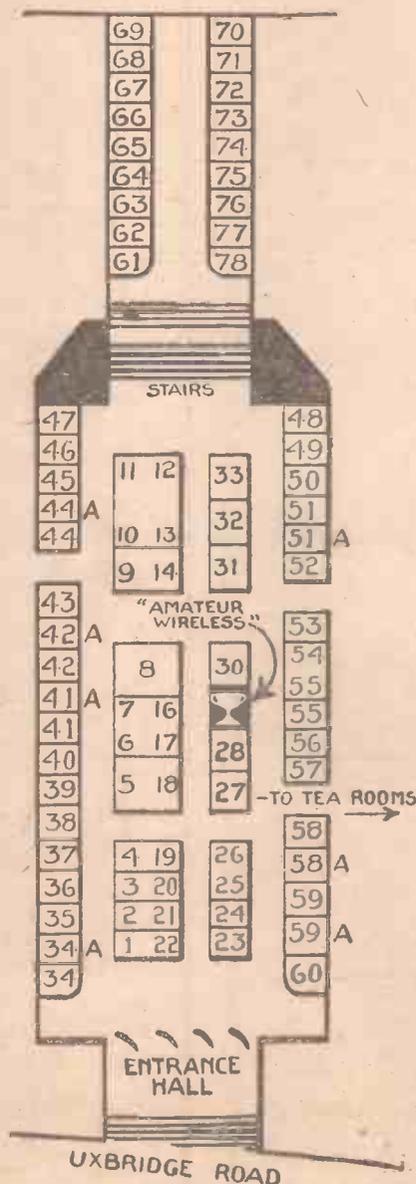
A talk on coal mines will be given by Prof. James Riton, B.Sc. Mr. George R. Lister will tell of his experiences at the pit bottom. These items will be followed by selections by the silver prize band run in connection with the colliery.

"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 Siegeskranz" 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.

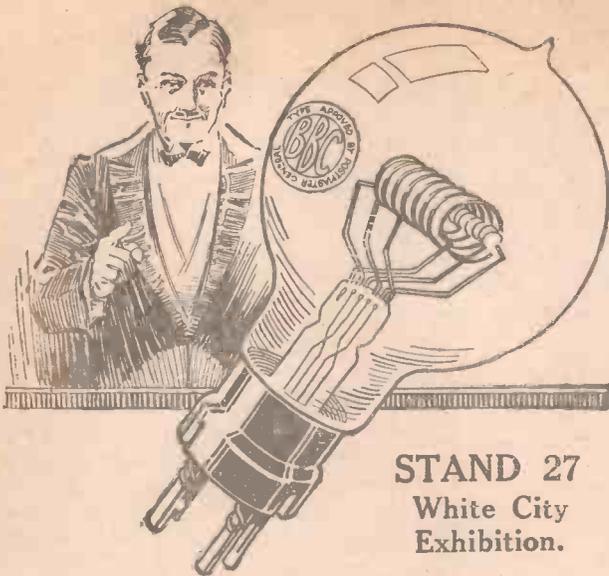
WHITE CITY EXHIBITION

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. | Tungstallite, 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. |



Mr. E. Conomy says:



**“ELECT PENTON
AND REDUCE CURRENT
TAXATION.”**

The cost of a valve to you is not the price you pay for it—but what you ultimately pay to feed it with current.

To discover whether or not a valve is economical—add to its first cost all costs of accumulator charges over a set period—then compare with the costs of the same period using a:—

**PENTON
LOW CONSUMPTION
VALVE**

Take a twelve-week period, using your set, say, 4 hours each day with an ordinary “R” Type valve. During that period your accumulator will require recharging ten times at 2/- per charge, or 20/- in all.

With a Penton Low Consumption Valve, the accumulator will require charging only twice in twelve weeks—costing you 4/- only!

You therefore save 16/- current taxation in twelve weeks and the

PENTON LOW CONSUMPTION VALVE

**COSTS
ONLY**

15/-

Saving more than
its own cost!

Type H.E.4 for 6-volt accumulator. Plate voltage 40. Filament Current .15 amp. Filament volts 5. 15/-. Postage 9d.

From all good dealers or direct from
PENTON ENGINEERING CO.,
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Telephone: Museum 4861. Telegrams: Erpentobal, Kinross.



**Give life to your
SET!**

Increase your range and get more
volume with the—

**NATIONAL SUPER
CRYSTAL COMBINATION**

Another glowing tribute (unsolicited) from an astounded user:—

Chipping Norton.

“Dear Sirs,

May I express to you my great satisfaction at the way your Crystal performs. I am roughly 50 miles from Birmingham, and receive that Station nightly, and can frequently hear London, Cardiff and Manchester. After my experience with the so-called Crystals in the R.E. Wireless Section during the late War, I am astounded at the strength and clearness of the signals your Set receives.”

Signed.....

**Scrap the “duds”
—buy the “goods”**

We claim that the National Super Crystal combination is the world’s best—that there is nothing to equal it for life and sensitivity. Users know this already—and if you do not find it so, we will at once refund your money. Buy the National to-day—prove it to-night.

From all Wireless Stores, or direct for

1/9

Refuse substitutes—they are inferior.

postage, 2d.

IMPORTANT NOTICE

Owing to the enormous expansion of our business, we have been compelled to seek new premises offering more room for factory extensions, therefore kindly note our

CHANGE OF ADDRESS

At these new works (to which all letters should be addressed) we have equipped a complete General Service Department, Repair and Accessory Department, and Accumulator Charging Station.

ALL RADIO COMPONENTS ALWAYS IN STOCK.

**NATIONAL WIRELESS
AND ELECTRIC CO.,**
42, Gray’s Inn Road, London, W.C.1.

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." :: ::

TRADE **Grelco** MARK

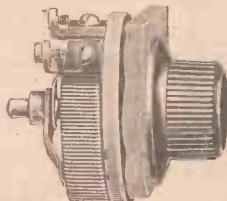
THE GRELCO LOUD SPEAKER HAS

attained extraordinary popularity purely on its outstanding merits. We ask you to come and hear it.

The technical staff of *Wireless Weekly* report (Sept. 10th.)—
"The tone of the instrument was a matter of favourable comment."



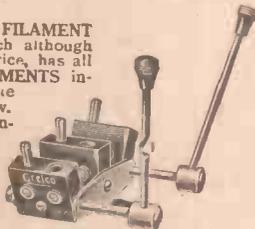
LAMINATED POLES
Adjustable Air Cap
Height 22". Flare 1" dia.
Base 6 1/2" dia., £2-10-0
Special packing and post, 2/.



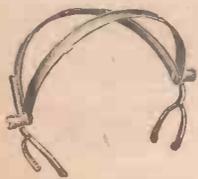
PORCELAIN BASE FILAMENT RESISTANCE, which although very moderate in price, has all **LATEST IMPROVEMENTS** incorporated. Ebonite shown in shadow. Porcelain is non-hygroscopic. Wire wound on special former.
6 ohm, 2,3 post 3d.
25 " 2,3 " "



TUNED ANODE ADAPTOR for connecting H.F. Transformer to Tuned Anode. 2/- each, post 2d.



The **NEATEST COIL HOLDER YET PRODUCED** for panel mounting. Delightful to use and "tension" adjustable. Finished in polished N. P.
2 coil ... 3/6 ... post 4d.
3 coil ... 5/- ... "



Polished ALUMINIUM Adjustable Headband
2/- each. Post 3d.

Telephone: MUSEUM 751

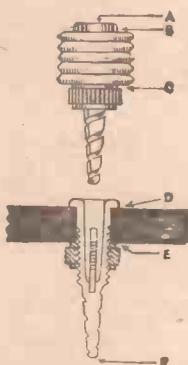
Works: SLOUGH

ELECTRIC GRAFTON COMPANY

54, GRAFTON STREET, LONDON

TOTTENHAM COURT ROAD.

Solder all connections, Where you can't—use "CLIX"!



Clix Popularity—the Secret!

You can't have efficiency in Radio anywhere unless you have efficient contact everywhere.

You can't use solder everywhere—but you can use CLIX.

By virtue of the tapered threaded design of its plugsocket, CLIX ensures perfect contact—an obvious improvement on various forms of split-pin plugs, which, however accurately machined, can only permit of a "two-point" contact. Think it out!

CLIX may be wired at points A, B, C, D, or E. F affords an ideal point for soldering when permanent connections are required.

Retail Prices

CLIX with Locknut, 3d.
CLIX INSULATORS (Six colours) 1d. each.
CLIX BUSHES (Six colours) 1d. pair



Obtainable from all Wireless Dealers or direct from the Patentees and Manufacturers:

AUTOVEYORS LTD

Radio Engineers and Contractors

84 VICTORIA ST., LONDON, S.W.1

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" EDISWAL 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

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 ma, £8. M.G. Mortley, 1,200 v. 90 ma, £22. M.G. B.I.H. 750 v. 80 ma, £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 Ticker Recorders indicates the great interest taken in recording distant wireless signals. Cost £40. Few left at £6 10/-.

Put a .03 mfd. CONDENSER across your H.T. battery. Neat and effective, 1/6 each. Mica condenser squares, 2,000 thick 2 1/2" x 2 1/2", 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 glass cotton, 5d. 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', 100', 100', 1/3; 110' cartridge aerial, 1/3. Morse practice outfits, 5/6. 25,000 pairs zincite-borite crystals in Pericon 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 Ct, 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 10/-, Crystal and 1-valve. B.W.G., toll-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 10/-, 6-Valve H.F. and L.F. Mk. IV, £5 10/-, 7-Valve Marconi 55, £8. Brown's micro. amp. less reed and button, 25/-.

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
Telep one—Avenue 4166. CALL AND SEE STO K Telegrams—Electradix Ltd.

Barclays N.A.Z.

10,000 New R.A.F. STEEL TUBE MASTS, at 15', 7/3; 20', 10/-; 25', 12/8; 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.

200 WATT MIDGET ALTERNATORS, 52A

The most perfectly made little Generator used on aircraft, gives 500 cycles 10 volts 20 amps, weighs 7 1/2 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, 5/5, 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 magnet, 4,000 ohms, polished wood base, rubber feet, ebonite horn, etc., 35/-, reduced to 20/-, Best british.

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, Naiders, Weston, Paul, B. and E., etc., in all ranges from microamps up to 1,000 amps. A.W.C. 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, Ganpbrell, Muirhead, etc., in all ranges. Fitted ebonite panel with plug top or switch. Prices 10/- to £3. Alarm for special list or state requirements. Large stock of laboratory condensers by same makers, with plug or switch for ranges from 1/2 mfd. to 8 mfd. Beautifully made in polished mahogany cabinets. Cheap to callers. Vertical galvanos., 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 French M.I.I. 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, £8. 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. 10" spark certs, Marconi, £4.

Build your own set.



and
USE ONLY



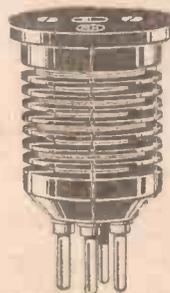
COMPONENTS

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/-



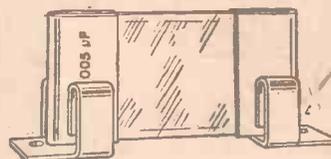
FIXED CONDENSERS

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.M. MICHAEL 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 indifferant patch in the matter of Trans-

atlantic 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 LO on November 23.

A miscellaneous light programme will be broadcast from 2 LO 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 FL, 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.

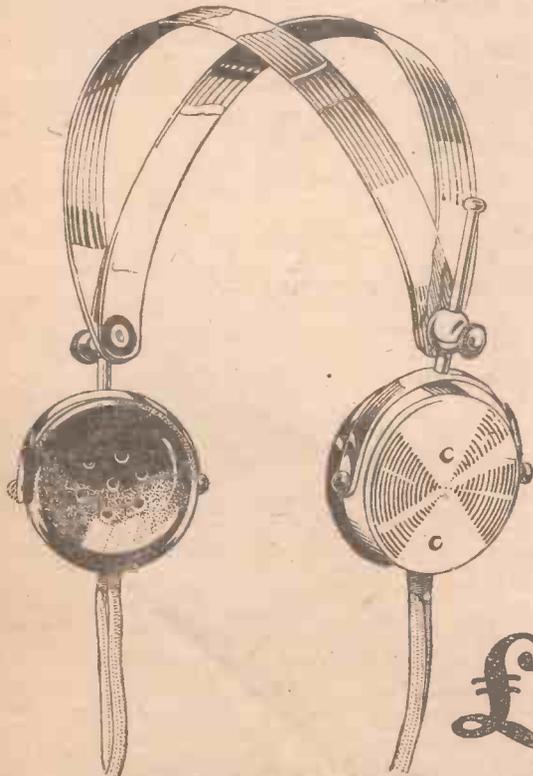
Mr. George Bernard Shaw will broadcast from 2 LO his own play *O'Flaherty, V.C.*, at 8.30 p.m. on November 20.

A London amateur, 6 QZ, Mr. Emery, has been successful in re-transmitting the
(Continued on page 802)

— Announcing our "SUPRATONE"

HEADPHONES.

"FOR LIFELIKE REPRODUCTION"



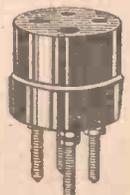
After considerable experiment we are placing on the market headphones we can genuinely recommend to our numerous customers, and which will be found to conform to our reputation and "value-for-money" policy. The SUPRATONE headphones have a resistance of 4,000 ohms and are constructed of the finest material throughout.

The Duralunic™ headbands are adjustable and permit the raising or lowering of the earpieces, ensuring perfect comfort for any wearer. Only the finest insulated wire is used for the magnet windings.

VALVE HOLDER.

Of best quality throughout ... 9d.

All types of Terminals and Brass Parts supplied at Keenest Prices.



Send for our interesting 1924/5 Catalogue To-day.

WATES BROS., Ltd.,

12, 13, 14, Great Queen Street, Kingsway, W.C.2.

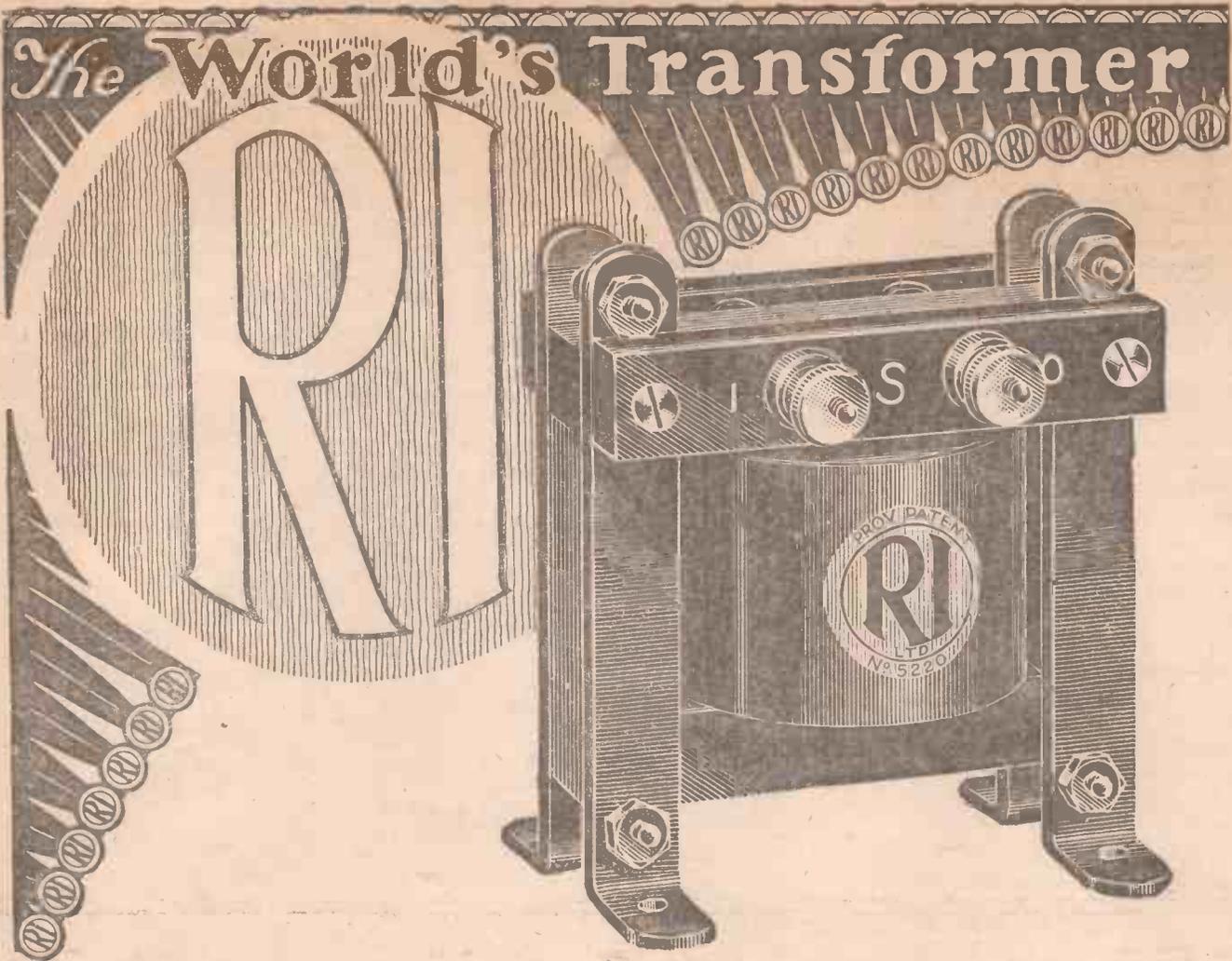
'Phone : Gerrard 575 and 576.

'Grams : Zywateseng, Westcent.

WORKS : LONDON, BIRMINGHAM, AND WESTCLIFFE.

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Factors and dealers, get our special trade terms.



Lack of Distortion—Abundance of Volume.

These are the points that are nearest the heart of every amateur when he buys a transformer. Ill can he afford to continue to purchase transformer after transformer till he finds the one that suits his particular circuit ; he should learn now that the R.I. suits every circuit. R.I. engineers, differing from all others, specialised in making a

GENERAL PURPOSE TRANSFORMER,

but in the production of the universal type, they never lost sight of the ultimate.

Lack of Distortion—Abundance of Volume.

It is therefore not remarkable that the brains and experience that have been in such demand for over a quarter of a century, coupled with precise and careful manufacture, should produce

THE MASTER TRANSFORMER.

RADIO INSTRUMENTS LTD.

12, Hyde Street, Oxford Street, W.C.1.

Telephone: Regent 6214-5-6. Telegrams: "Instralio, London."



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 (6LV) 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 8DGI 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.



The new wireless invention
**NO MORE HEADPHONE
-ACHES**

**NO PAINFUL
HEAD BANDS.**

At last the highest science of Acoustics has been applied to Wireless Earphones and the outcome is the "MIC."

A perfect pair of earphones, the "MIC" phones are negligible in weight and have no headbands. Consequently there is no uncomfortable pressure on the head nor unpleasant and dangerous perspiration in the ears.

The reception with "MIC" phones is clearer than with the now obsolete headphone and the volume of sound is adjustable. Yet the "MIC" phones are so tiny that they fit easily into a corner of the waistcoat pocket.

Full particulars from:—

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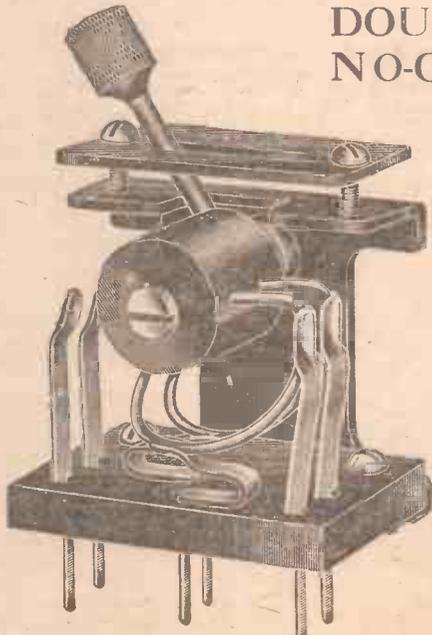
The "MIC"
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THE PAIR
COMPLETE
In leather pouch
3½ x 2"

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**DOUBLE-THROW
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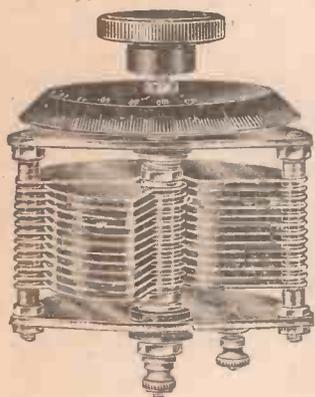
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Variable Condensers

Carefully constructed to give the maximum of efficiency, but as low-priced as is compatible with the finest workmanship. Fit one of these condensers to your set—it will greatly improve delicate tuning.

Prices:—

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

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The LISTOLEON Transformer is so well constructed that we are able to guarantee it for a period of two years. The coil is wound by specialists of 25 years' experience, and contains almost twice as much wire as any other competitive transformer sold at 25/-.

The gauge of wire used is such that a current of 20 milliamps can be safely carried continuously. The LISTOLEON Transformer is therefore eminently suitable for use in conjunction with the biggest types of power valves used for broadcast reception. The LISTOLEON Transformer measures 3 3/4 in. long by 2 1/2 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 LISTOLEON 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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Fellows Coils. For all purposes. Standard non-ferrous pin contacts 4/3 to 10/-



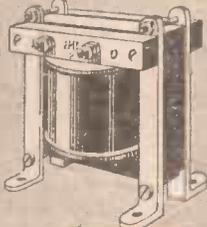
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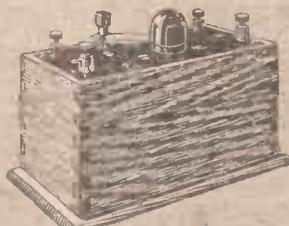
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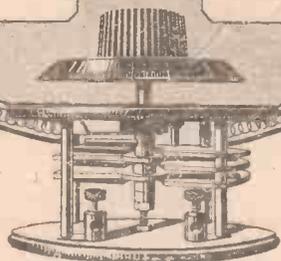
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Low Frequency Inter-Valve Transformer.
Accurate and distortionless 20/- each.



The Fellotone.
For varying and improving the tone of a Loud Speaker, 15/- complete for 2,000 and 4,000 ohms Speakers on y.



Variable Condensers for Panel Mounting. Highly finished with bronze bevelled dial as illustrated.

Variable Condensers: Capacities 0.0006 to 0.001 mfd. Prices 6/3 to 20/-

Whether you are constructing a set to last you five years, or just wiring up a "freak" experimental circuit for the evening you cannot afford to use anything but the best and most reliable components.

In many cases the best is also the cheapest and you are sure to find that the wide range of Fellows components will suit both your set and your purse.

The Fellotone condenser will improve Loud Speaker reproduction considerably and the Inter-Valve transformer is really distortionless. In fact, switch arms, filament resistances or variable condensers, they are one and all true examples of the well-known Fellows policy of

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Stands 1 and 22, British Wireless Exhibition, White City.

FELLOWS WIRELESS



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.).

Lynghy (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, a 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-Doña, 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-lez-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

Königswusterhausen (LP), 680 m. (4 kw.). 09.40, con. (Sun.). 2,450 m.: 10.20, con. (irr.). 2,550 m. (5 kw.). Wolff's Büro. Press Service, 06.00, 19.40. 2,800 m. (5 kw.): 10.50,

(Continued on page 806)

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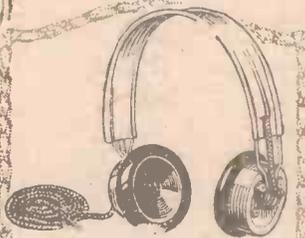
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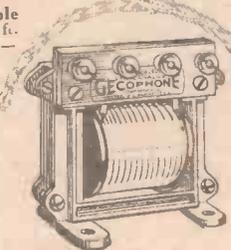
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BROADCAST TELEPHONY (continued from page 804)
 con. (Sun.). 3.150 m., Telegraphen Union, 06.00-20.00, news (week-days). 4.000 m. (10 kw.): Express News Service, 06.00-20.00 (daily).

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, 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.).

Lelpzig, 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 (NSP), 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 (IRO), 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.

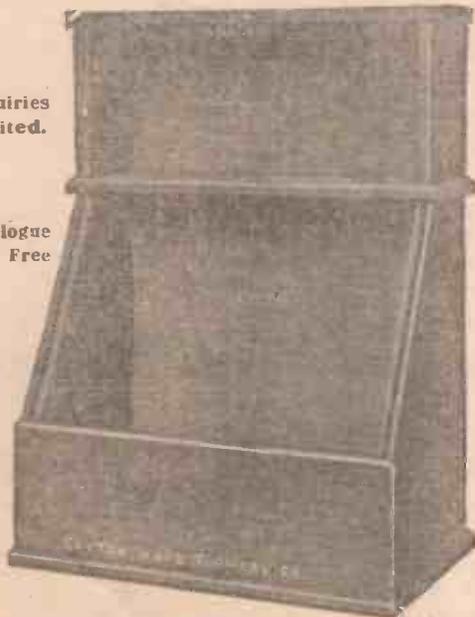
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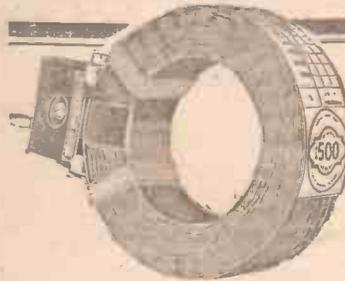


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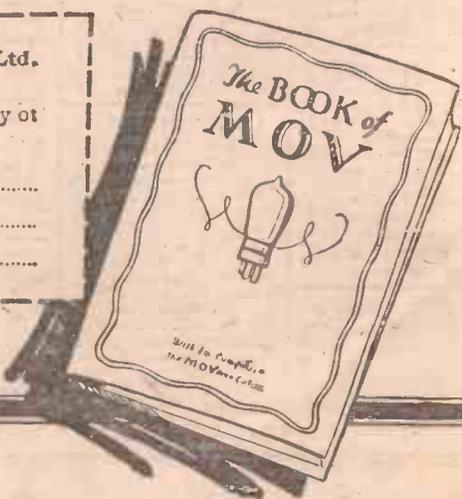
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Amplification

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 AR06, 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.

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PHONE 4857

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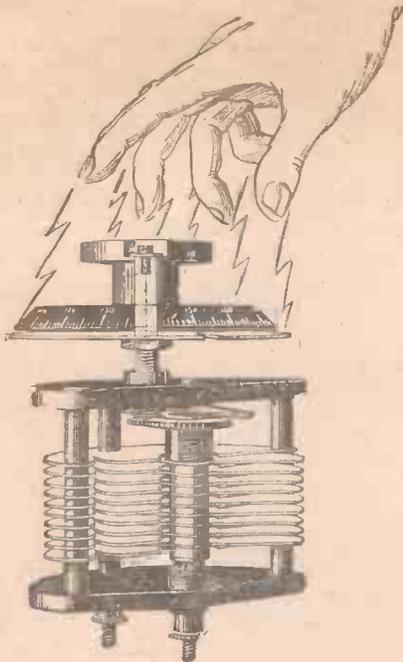
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CHIEF EVENTS OF THE WEEK

SUNDAY (November 23)

London	9.0	J. H. Squire Celeste Octet.
Birmingham	8.30	William Murdoch (solo piano-forte).
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 Giesecking (solo piano-forte).

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 Laverender.
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 <i>Elijah</i> .
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.

Free to readers of "Amateur Wireless"

A Copy of

"The Amateur Mechanic"

Send a postcard with your name and address to the Editor, "Amateur Mechanic," Room 97, Cassell's, La Belle Sauvage, E.C.4, and a free copy of this practical weekly will be forwarded to you post free.

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!

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CLUB DOINGS

Sidecup and District Radio Association
 Hon. Sec.—MR. L. N. MARTUS, Pilford, Knoll Rd., Sidecup, 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 Three pence. 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.

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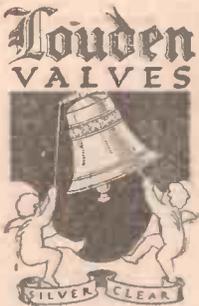
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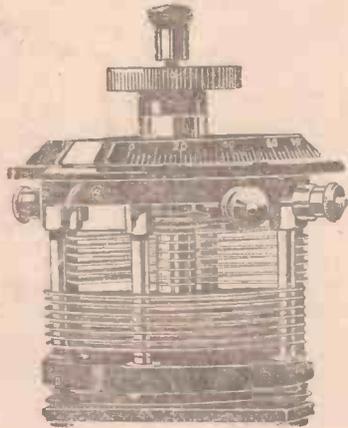
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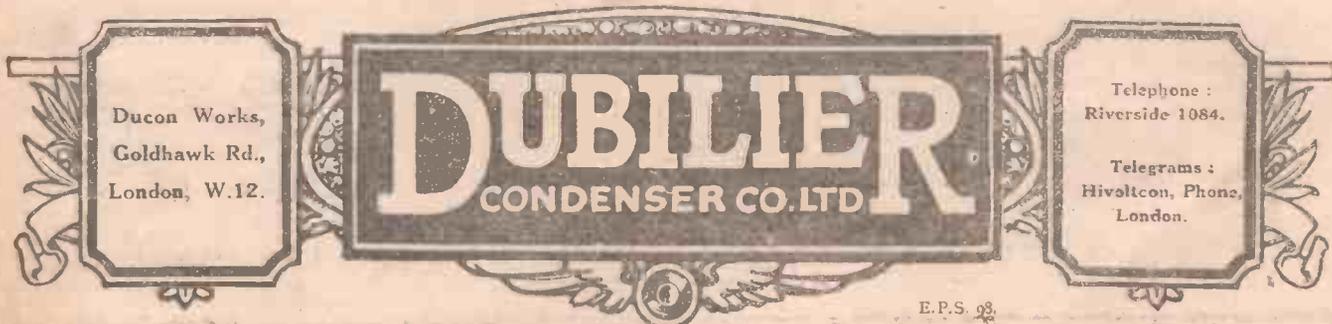
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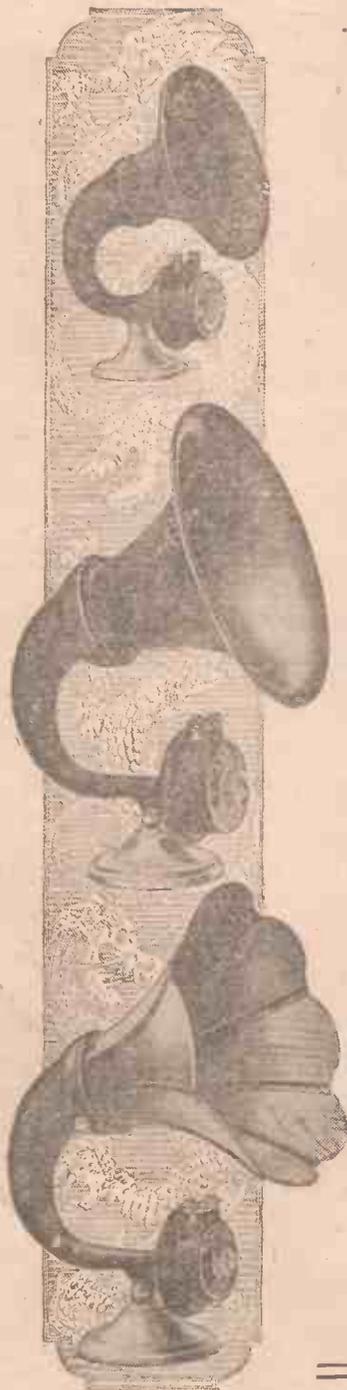
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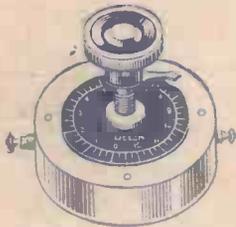
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