

CHEAPER VALVES!

Amateur Wireless

And Electrics

Vol. VI. No. 154.

SATURDAY, MAY 16, 1925

Price 3d

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EXPERIMENTS WITH
THE AUTOPLEX

MAKING YOUR OWN
LOW-LOSS COILS

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WITH FRAME AERIAL
AND TWO VALVES

THE TROPADYNE
"SUPER"

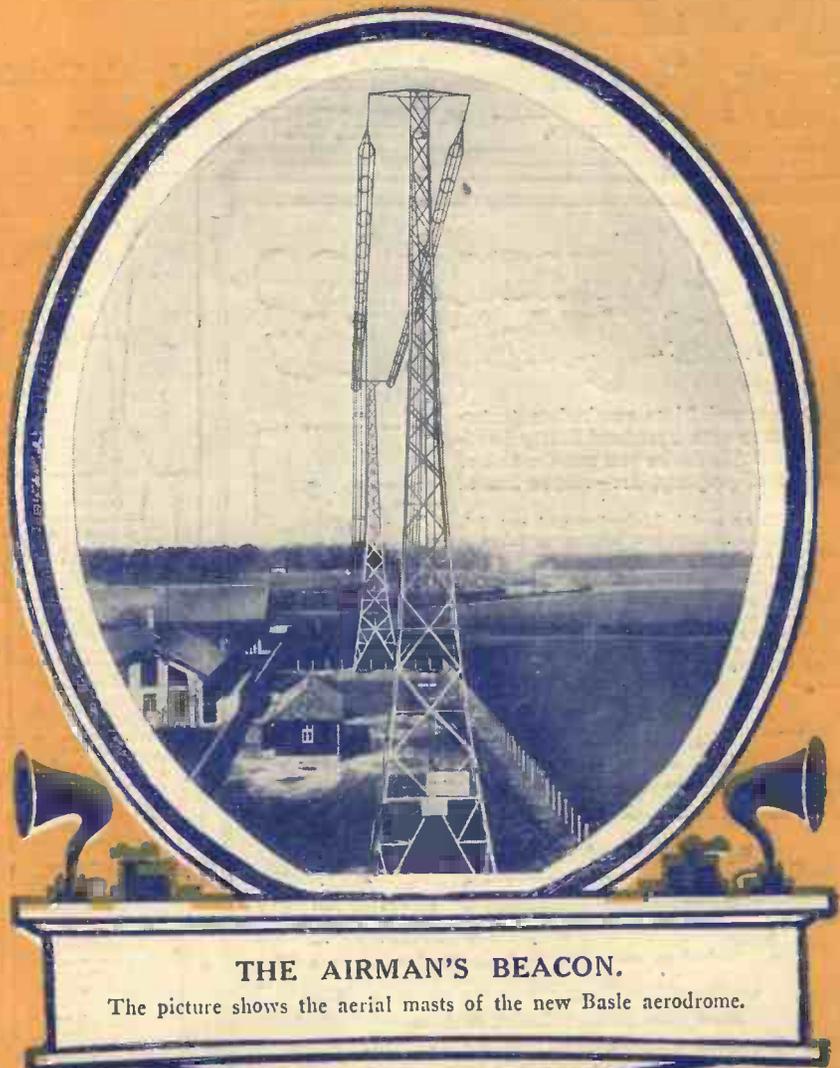
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THE AIRMAN'S BEACON.

The picture shows the aerial masts of the new Basle aerodrome.

Amateur Wireless

and Electrics

Vol. VI. No. 154

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CHOOSING A TUNER

An article in which the merits of various types are discussed.

WHEN it is decided to build a receiver, the first thing to do is to decide what method of tuning is to be adopted. The reader will, of course, know that the tuning of the aerial is adjusted by varying the inductance or the capacity of the circuit, but there are several ways of doing this, and it is here intended to discuss each of the more commonly used methods and to point out their advantages and disadvantages.

As a variable condenser is not an instrument that can easily be made by the home constructor, he often contents himself by varying the inductance only. One of the simplest forms of tuner consists of a coil of enamelled wire wound on a cylindrical former over which moves a slider, making contact with each turn in sequence at a point from which the enamel has been removed. A variation of this is the coil of wire tapped at every turn for ten turns, and then at every ten turns for a hundred turns. The tapings are taken to two sets of contact studs, and two switches are provided so that any number of turns from one to a hundred-and-ten may be placed in circuit.

method of tuning is not efficient except when receiving on or near the maximum wavelength of the tuner.

Another very simple method is that shown in Fig. 1. This is known variously as "plate," "spade," and "eddy-current" tuning. The principle adopted

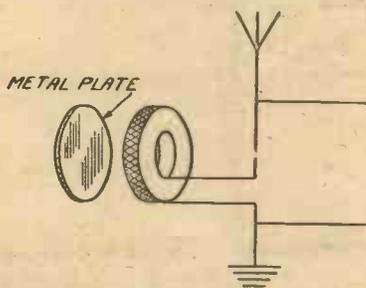
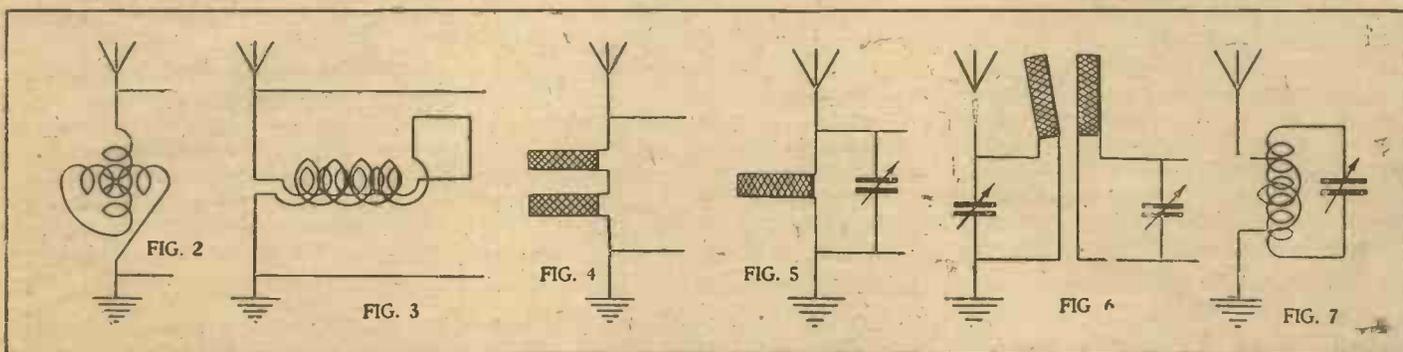


Fig. 1.—Plate-tuning System.

is that when a conductor is brought into the field of an inductance coil through which oscillatory currents are flowing, eddy-currents are induced in the conductor, and the inductance of the coil is reduced. In the form most usually employed a coil of rather large inductance is connected in

in the aerial and thus less energy is available for working the receiver.

A much more efficient form of tuning than the foregoing is the variometer, three forms of which are shown diagrammatically in Figs. 2 to 4. The familiar rotor and stator type is shown in Fig. 2. Here two formers are used and approximately half the aerial tuning coil is placed on each former. The formers are of different sizes, and the smaller is placed inside the larger and so arranged that it may be rotated through 180 degrees. When the coils are disposed so that the two fields oppose each other, the total inductance is at a minimum. The inductance can be increased by rotating the inner coil until the two fields reinforce each other, when the inductance is at a maximum. Home constructors do not find this type of variometer very easy to make, and frequently use the simpler arrangement shown in Fig. 4. In this case two basket or honeycomb coils are arranged so that the two fields may be made to assist or oppose each other to a greater or less extent. The diagram (Fig. 3) illustrates yet another form of variometer. Here two



Figs. 2, 3 and 4.—Three Types of Variometers.

Fig. 5.—Tuning with Coil and Condenser.

Fig. 6.—Loose-coupled Tuning.

Fig. 7.—Aperiodic Coupler.

Although the above method is both simple and cheap, it suffers from the disadvantage that the coil must be large enough to tune to the maximum wavelength on which it is desired to receive, and when working on a lower wavelength than this a number of unused turns are in close proximity to the used portion of the coil. As these unused turns absorb a considerable amount of energy, this

the aerial circuit and the inductance reduced to the value required to tune the aerial to the desired wavelength by bringing a metal plate more or less into the field of the coil.

Although with this system there are no losses due to unused turns, it must be remembered that currents are induced in the metal plate and the energy represented by these is taken from the signal currents

cylindrical coils are each wound with approximately the same number of turns and one slides inside the other, the total inductance being varied as before. This latter form has lately achieved a considerable measure of popularity owing to the fact that the coils may be wound with thick bare wire on skeleton formers, with the turns well spaced.

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THE DISTANT DETECTOR

A Novel Suggestion for the Crystal User

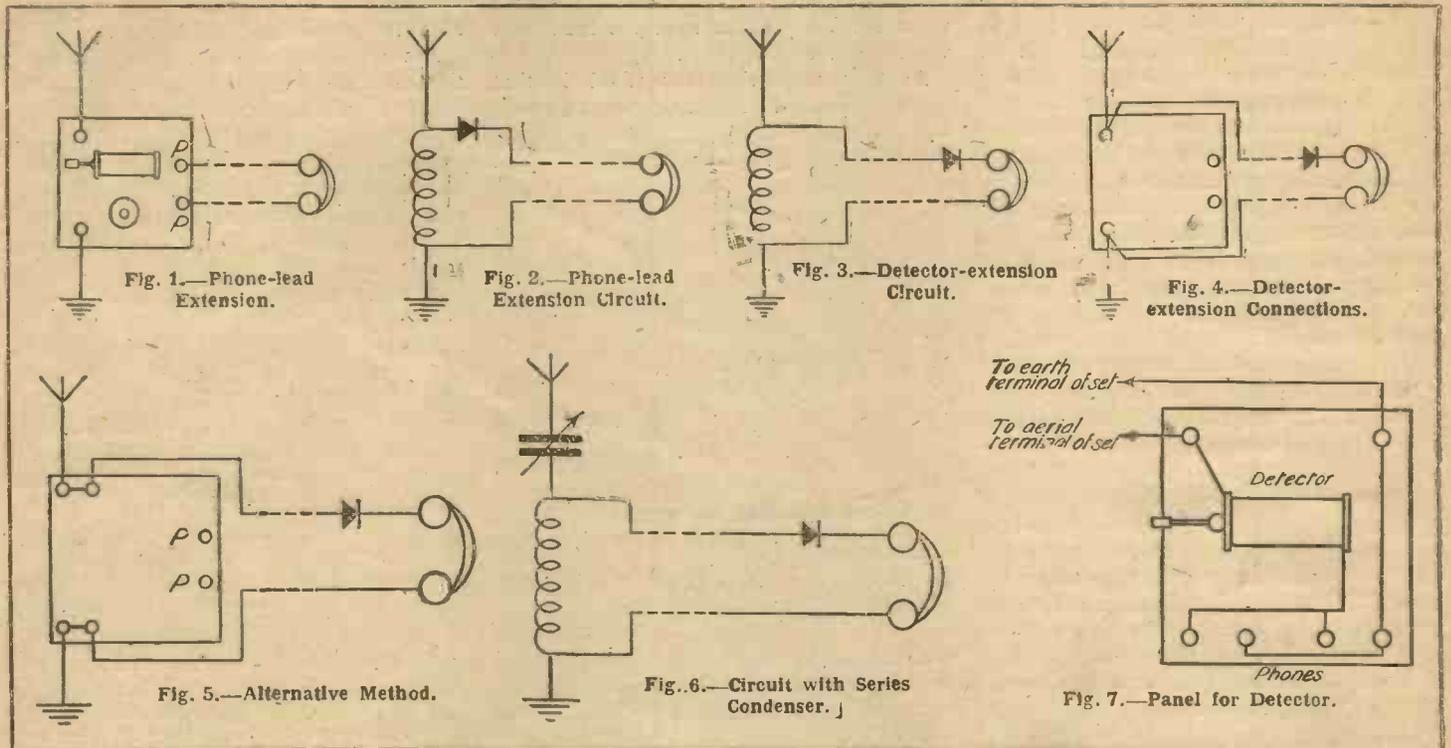
PROBABLY the majority of listeners-in wire their houses with extended phone leads so as to be able to listen-in in at least one other room. This is satisfactory when a valve set is used. When, however, a crystal set is employed, the detector requires adjusting from time to time, necessitating a journey to the room where the set is situated.

terminal of the distant detector. The other lead is joined at one end to the earth terminal of the set and at the other end to one tag of the phones. The other phone tag is connected to the second terminal of the detector.

If desired, two auxiliary terminals connected to aerial and earth terminals respectively may be fitted as in Fig. 5.

on a piece of ebonite 4 in. by 4 in., together with the necessary terminals, as in Fig. 7, and mounted on a convenient base or screwed to the wall. The diagram shows two pairs of phones.

It will be found that the apparatus works very successfully, and the crystal detector, now being close to the phones, can be adjusted whenever required.



This trouble can be easily overcome. Instead of merely extending the phone leads, as in Figs. 1 and 2, the crystal detector is taken to the distant room next to the phones, as shown in Fig. 3.

The connections to an ordinary crystal set are as in Fig. 4. One lead is connected at one end to the aerial terminal of the set and at the other end to one

Of course, when the distant detector is being used, the catwhisker on the set should be raised or the phones removed from the terminals PP of the set.

If the set is tuned by a series condenser, then the distant detector should be connected between the A.T.C. and the A.T.I. as in Fig. 6.

The distant detector should be mounted

Once the set has been tuned in, the tuning arrangement can be left alone.

The circuit is, of course, the ordinary crystal circuit, except that the crystal-phones shunt across the aerial-tuning coil is very long, and that the detector is situated away from the set so as to be within the most convenient reach of the listener.

G. C.

"CHOOSING A TUNER" (continued from preceding page)

It is then known as a "low-loss" variometer. The variometer possesses the merits of simplicity in construction and efficiency when used for tuning over a small band of wavelengths. Its disadvantages are that, although the inductance may be varied, the resistance remains constant and may introduce undesirable damping when used near the lower limit of its tuning range. (This does not apply to the same extent in the case of the low-loss type.) Also if the wavelength is increased by

the addition of a loading coil in series the tuning range is greatly reduced.

An efficient and convenient method of tuning when it is desired to cover a very large wave-band is that illustrated in Fig. 5. Here a fixed coil is connected in series with the aerial and the capacity of the circuit is altered by adjusting the variable condenser connected across the coil.

For various reasons a set connected directly across the aerial coil is not very selective, and if interference from other stations is anticipated loose-coupled tuning may be employed. This is shown in

Fig. 6. By induction some of the energy flowing through the aerial coil is transferred to the closed circuit formed by the secondary coil and condenser. The looser the coupling between aerial and secondary coils, the greater the selectivity of the set. Many of the advantages of the methods shown in Figs. 5 and 6 are obtained by using aperiodic coupling (see Fig. 7). Here the aerial circuit is "aperiodic," or untuned, and is coupled to the tuned secondary circuit by means of a few turns of thick wire wound directly over the secondary coil.

J. F. JOHNSTON.

EXPERIMENTING WITH THE AUTOPLEX

An Account of a One-valve Loud-speaker Receiver

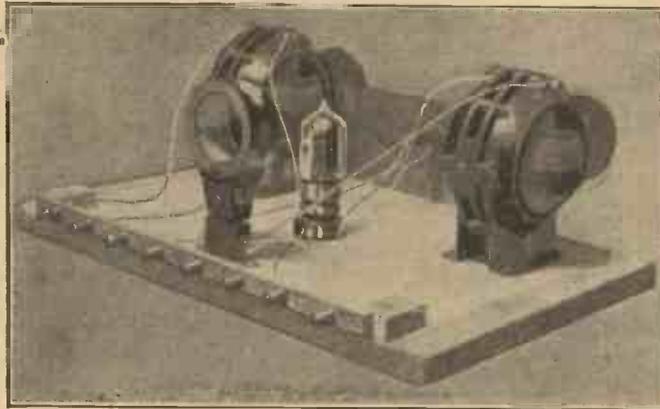


Fig. 1. The Author's Experimental "Hook-up"

ABOUT twelve months ago, the author's interest was aroused in a particular circuit, then very popular in America, and due to Mr. Muhleman, who described his experiments in a series of articles appearing in our American contemporary, the *Radio News*. A circuit diagram is reproduced in Fig. 1, gleaned from one of the articles in question. The circuit is a simplification of an Armstrong single-valve super-regenerative receiver. The principal feature of the Autoplex circuit is that all possible capacities are considerably reduced.

There is a great deal of similarity between the R.A.F. short-wave receiver shown in Fig. 2, no doubt familiar to many during the war, and the Autoplex circuit. The most apparent differences in the

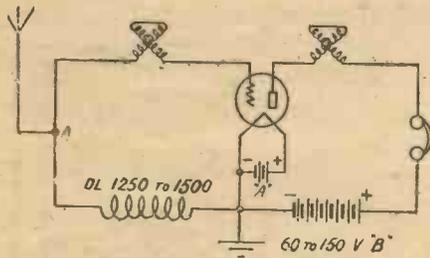


Fig. 1. The Original Autoplex Circuit.

R.A.F. circuit are the use of a grid condenser and leak and a variable resistance in place of a choke coil.

The principal object in designing the Autoplex circuit, we are told by the inventor, was to operate a loud-speaker on one valve. It was not designed for long-distance work, but transmitting stations a thousand miles distant from the receiver have been brought in on the loud-speaker when local stations have closed down. It was the latter statement which aroused the author's interest and enthusiasm, and it was principally with this in view that the possibilities of the circuit were investi-

gated. The present article is therefore a résumé of careful experiments based upon Mr. Muhleman's work.

As readers will probably know, the conditions for reception in the United States of America are quite different from those in this country, and favour long-distance work rather more than do conditions over here, so it was quite novel ground upon which to try out the Autoplex circuit. Besides, a set could be constructed cheaply, and as subsequent experiment showed, proved very reliable and satisfactory in operation on an earth connection only when properly handled.

Experimental Arrangements

To experiment, the author conceived the idea of mounting the components of his apparatus upon a disused dinner or pastry board. As will be seen from the photograph above, the apparatus comprises two variometers, a coil holder, a valve holder, filament resistance, and battery terminals, also additional terminals for aerial and earth for use as required.

The variometers used in this set must have a comparatively large number of turns on both the rotor and the stator; that is to say, there must be at least sixty turns on each. Commercial variometers which have been used with satisfaction are made by the General Radio Company and the Igranic Electric Co., Ltd. Those shown are the Igranic S.R. type.

Some idea of the results to be obtained from this set may be gleaned from the statement that with the apparatus shown in the photograph, and using a 200 plug-in coil instead of a 1,250 coil, which is to be recommended, London was received about ten miles from 2 L O, by using an earth connection only, in sufficient volume to work a small loud-speaker at a little less than moderate strength. A Dutch amplifying valve was used. With a 1,250 coil better reception was obtained, especially in D.X. work, for which the set seems peculiarly suitable. Apparently the weaker the incoming signals the greater the amplification to be obtained. It is desirable that the coils used for choking be of low self

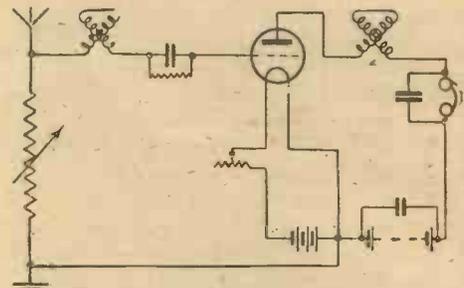


Fig. 2.—R.A.F. Short-wave Receiver Circuit.

capacity, and honeycomb coils are preferred for this purpose. Tuning was found to be comparatively broad.

A variable resistance, as in the R.A.F. circuit, was tried in place of the choke coil, but the results obtained were not equal to those reported above. An aerial and earth were tried together and independently, as well as a frame aerial, but the best results were obtained by using an earth lead connected directly to the aerial terminal.

The matter of providing a suitable earth or aerial seems a very important one, for if these are not suited to the peculiarities

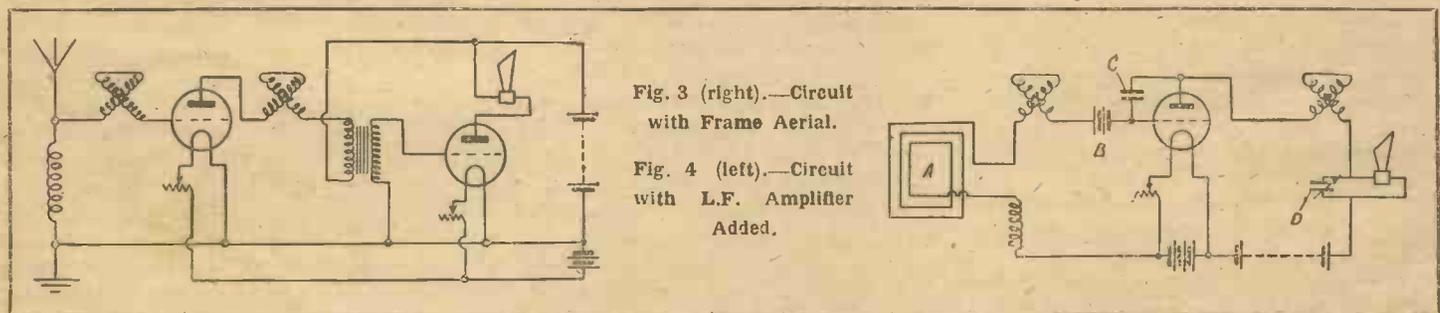


Fig. 3 (right).—Circuit with Frame Aerial.

Fig. 4 (left).—Circuit with L.F. Amplifier Added.

of the set reception is marred, and for this reason the experimenter is advised to try several arrangements of aerial and earth systems. Collective agencies having small surfaces were found most suitable.

Peculiarities

Before making up a permanent set the

direction, and when it is difficult to make the valve oscillate the condenser effect between the grid and anode contact elements of the valve should be investigated. This, as most readers know, is present, and may be increased if necessary by suitably fastening pieces of flexible wire to the respective legs of the valve holder and twist-

out in an attempt to introduce amplifiers into the Autoplex circuit. At first it was thought that a high-frequency amplifier would be better than a low-frequency amplifier, but low-frequency amplification was subsequently adopted, not, however, without the difficulty of matching the impedance of the primary of the transformer

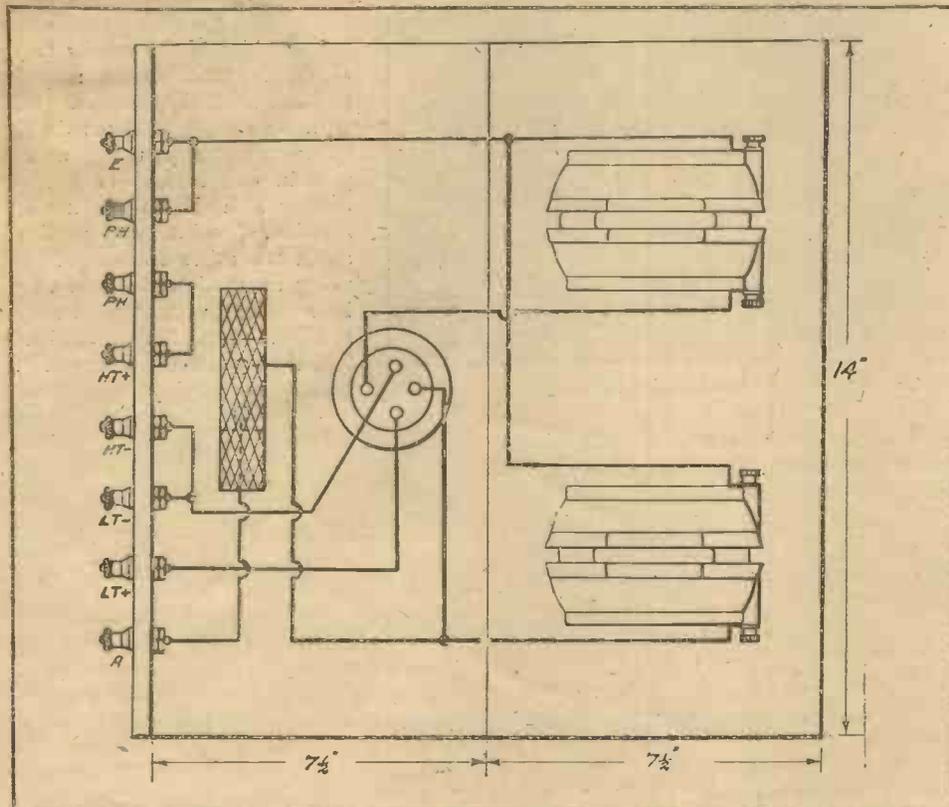
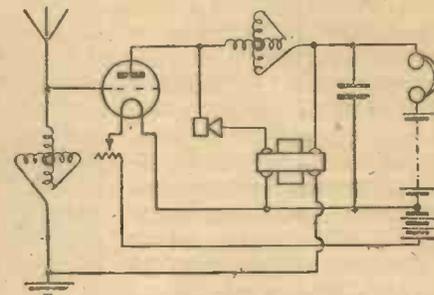


Fig. 7 (left).—Arrangement of Components.
Fig. 6 (above).—One-valve Reflex Circuit.



with that of the valve. Fig. 5 is a schematic diagram, showing the addition of a low-frequency amplifier to the Autoplex circuit.

The experiments, however, did not stop at this point, as the circuit shown in Fig. 6 was published in AMATEUR WIRELESS at about the time these particular experiments were being made, and not differing greatly from the original Autoplex circuit of course aroused considerable interest. It is a reflex circuit which can be recommended with confidence to anyone requiring a simple set, and at the same time it enables anyone contemplating its construction to experiment with the Autoplex circuit before finally assembling the set. This reflex circuit, when connected to a standard P.M.G. aerial, ten miles from 2 L O, operates satisfactorily a loud-speaker in sufficient volume to fill a moderately large room.

For those who wish to make a permanent Autoplex receiver attention is directed to Fig. 7, which shows a development of a panel and baseboard, the two being arranged in one plane in order to illustrate the wiring. The size of panel and baseboard recommended are those indicated in the drawings. An ebonite strip is arranged along the back for supporting the terminals, a cabinet of the usual American form being provided for the reception of the set.

H. J. H.

At the first congress of the newly-formed International Amateur Radio Union, held in Paris recently, it was decided, by an almost unanimous vote, to adopt Esperanto as the international auxiliary language for international wireless telegraphy and telephony.

The Zurich broadcasting stations now relays grand opera from the local theatre three times weekly.

reader is advised to build up a set on a panel for experimental purposes, as there is much to learn before the set can be satisfactorily operated. The set is not quite so simple as our American friends would wish us to believe. For example, it will be found that a particular station will come in at four different settings of the variometers, and that at one of these settings the signals will be louder than at the other three. When such setting is found, body capacity effects are very prevalent, and the slightest movement, or even the hand grasping the telephone cord, will cause a howl. It is for this reason, more than any other, that the set should be used solely for loud-speaker work. Through a loud-speaker circuit noises are less objectionable. Noises are present from a number of causes, though many disappear when a station has been properly tuned in.

The suggestion that the suitability of the aerial and earth systems should be investigated will probably assist a great deal in removing noises from the set, but if this is not satisfactory, it is suggested that a rheostat be introduced into the filament circuit. Filament control will not be found critical. The employment of a grid battery is useful to stabilise the set if any difficulty should be found in this

ing the flex the required number of times to provide the requisite capacity.

A supplementary grid-anode condenser has another effect, that is, increasing the wavelength range of the receiver. Increasing the tuning range may also be effected by introducing a variable condenser across the loud-speaker or telephone terminals. An alternative aid to tuning when using an aerial and earth system of the usual kind is the provision of a variable condenser of, say, .0005 microfarad capacity in the earth lead.

Using a Frame Aerial

It is not suggested that all these experiments be attempted at once, but only those found expedient, because lumped capacities would again be introduced into the set. Fig. 4 has, however, been prepared to illustrate how a frame aerial and certain of the other components are introduced. The frame aerial is indicated by A, the grid bias battery by B, the grid anode condenser by C, and the variable condenser across the loud-speaker by D.

The Autoplex circuit works quite well with a frame aerial, but the best results are obtained by only connecting the aerial terminal directly to earth or to a short length of electric-lighting flex.

A number of experiments were carried

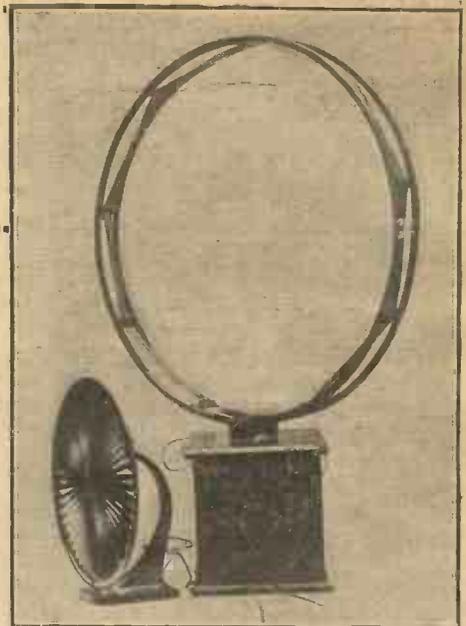
LOUD-SPEAKER WORK WITH FRAME AERIAL AND TWO VALVES

IN the issue of "A.W." No. 139 (January 31, 1925) a description was published of a two-valve Reinartz receiver. The set as described was suitable for the reception of all wavelengths by the simple expedient of changing the tuning coil. Terminals for attaching the special coil were shown provided with screw-down sections both behind and on the front of the panel.

It is also possible to use the identical set for the reception of local broadcasting at full loud-speaker strength on a frame or "loop" aerial. A set of only two valves capable of working a loud-speaker off a frame is somewhat of a novelty. It is, however, perfectly practicable with the set described owing to its ease of control and

To understand the working of the set on the frame aerial it should first of all be realised that the loop or frame is nothing more or less than an "outside" in tuning coils. Actually the set as originally described will receive without aerial or earth connections, but only faintly and with very critical tuning.

Whereas in the original arrangement of the set the tuning condenser acts over only two-thirds of the inductance of the closed oscillatory circuit, for frame reception it is arranged over the whole of the coil. Fig. 1 is the theoretical diagram, and it will be seen that the points A and B are connected together. It will also be noticed in the photograph that they are strapped together.



Frame Aerial, Two-valve Receiver and Loud-speaker.

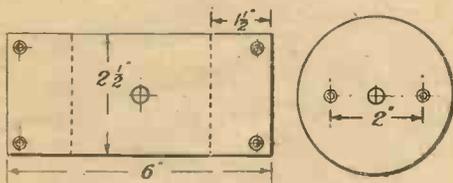


Fig. 2.—Stirrup and Damping Plate

efficiency. The arrangement is suggested as being particularly useful to the flat-dweller within a radius of four or five miles of the transmitting station.

Results

To those familiar with London the following facts will convey a good idea of the capability of the set. At a first-floor flat at Earl's Court and at a top-floor flat at Ladbroke Grove splendid results were easily obtained on Amplion (five-guinea model), Sterling Primax and Bullphone (Dragon type) loud-speakers before the strength of 2 L O was increased. Also perfectly good loud-speaking was achieved near Bromley, Kent (eleven miles). At the greater distance more patience and skill in adjustment was required than the average listener would be prepared to give.

It should be carefully noted that in all cases two Marconi-Osram DE5 valves were used with 90 volts on the plates. These particular valves, B.T.H. B4, Mullard DFA1, or Ediswan PV5DE are essential for completely successful results. The valves work from a 6-volt accumulator, take only .25 ampere each, but cost 30s. The same makers offer 4-volt valves with other characteristics the same at 25s. each. These should be just as suitable, but the writer has not had the opportunity of trying them.

Frame Aerial

The frame aerial being little more than a large tuning coil, the length of wire with which it is wound is approximately the same as that used in the construction of the small coil. There are, of course, less turns owing to the very much increased diameter. The actual number of turns is fourteen of No. 22 d.c.c. wire, with a tap three turns from the end. The tap is connected to the terminal marked "Earth," the end of the eleven-turns coil to the strapped terminals A and B, and the other end, the three turns, to the terminal marked "Aerial." The three turns are the reaction coupling.

The frame for the loop was made from two children's wooden hoops 28 in. in diameter, smoothed, stained and varnished. The hoops are separated by nine ebonite

outer circumferences of the hoops the laminations of wood of which they are made might have sprung apart.

Three terminals are mounted on the two lowest strips, two on one and one on the other. The ends of the frame coil are soldered to two of these terminals and the tap to the other one. The wire is wound moderately tightly over the distance pieces, and spacing slots in these were not found necessary.

The assembled frame is held by a stirrup of 16-gauge brass sheet cut to shape and bent as shown in Fig. 2. This stirrup is in turn fastened to a circular "anti-capacity" shield screwed to the centre of the top of the cabinet. A spring washer is used in clamping the stirrup and the plate together, so that the frame is free to revolve while still being held securely. It will be found that the setting of the

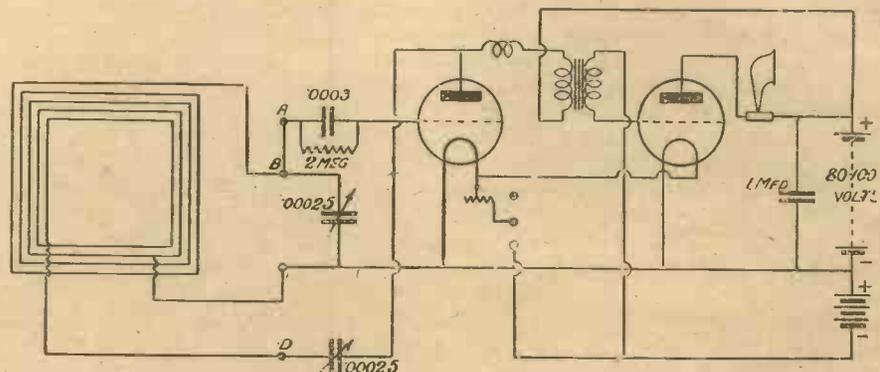
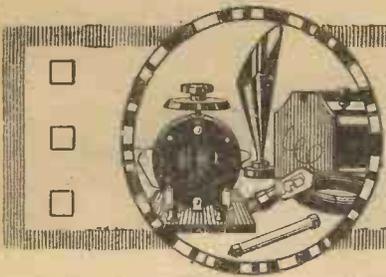


Fig. 1.—Theoretical Diagram.

pieces, 3 in. by 5/8 in., cut from an odd piece of 1/8-in. panel. These distance pieces are let into the inner circumference of the hoops at equal distances, and each is attached by four small brass screws with countersink heads. It was feared that if the ebonite-pieces had been let into the

direction of the frame aerial is not very critical, but a slight movement can be made to yield a fine vernier control over tuning, probably due to the slight alteration in the relative positions of the connections between the frame and the terminals of the set.

D. G. O. H.



PRACTICAL ODDS AND ENDS

Protecting the H.T.

HIGH-TENSION batteries of the dry-cell type now produced by our leading manufacturers are so good in use that the amateur is apt to forget all about them. Thus this important part of the wireless receiver is consigned to some little-used corner, where not only does it collect dust, but generally forms the resting-place of pliers or screwdrivers not in use.

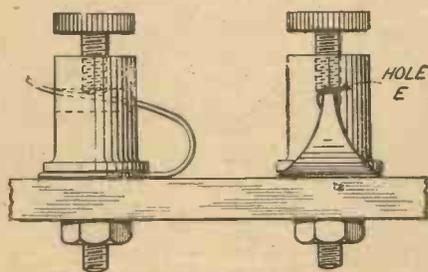
That this practice is wrong cannot be over-emphasised. The reason is obvious why metal objects should not be put on the top of the battery, but the harmful effects of dust are not quite so well known. When the weather is damp the dust on the battery soaks up moisture from the atmosphere, and the current uses the damp dust to leak across the terminals, thus discharging the battery and causing crackling noises when the receiver, to which it is connected, is in use.

It is thus desirable to keep the H.T. battery in a dustproof place, but if this cannot be done it should be kept clean by constant dusting. S. J. M.

Handy Spring Terminals

SPRING terminals of the kind suitable for connecting up phone and battery tags can be constructed very easily, as shown in the sketch, from terminals of the ordinary sort.

A strip of springy brass is cut to the tongue-shape shown, a hole the size of the terminal bolt being drilled in the



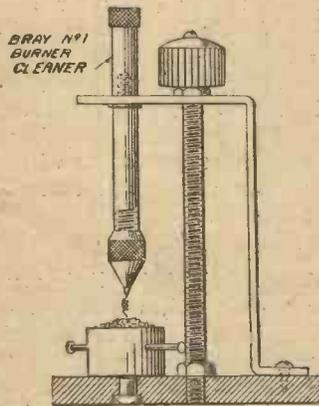
Details of Spring Terminal

larger end. The shank of the terminal is passed through, and the whole is then screwed down tight with the metal tongue bent back through the wire hole of the terminal.

If it is only desired to use the terminals for quick detachable connections, a neater appearance will be given if the ordinary screw be sawn (or filed) off short and then screwed home. E. M.

Novel Catwhisker Support

A GOOD catwhisker holder can be made from one of those little gadgets which are used for holding thin wire when cleaning out acetylene-lamp burners. These holders are fitted with a small chuck at



Method of Supporting Catwhisker.

one end, so that the fitting of the catwhisker is quite a simple matter. The diagram shows the construction of a complete detector employing a holder of this type, and it will be seen that a very firm and stable contact is possible. A length of screwed rod is fitted at one end with an adjusting knob for regulating the pressure of the catwhisker. The holder itself is in two parts, one of which screws into the other. A hole is made in the horizontal part of the brass strip, the end of the holder containing the chuck is passed through, and the top is then screwed down till the holder is tightly secured. J. E.

Folding Paper Diaphragms

THE jig described will be found excellent upon which to fold the pleated-paper diaphragm of a loud-speaker, and is so simple to make that most amateurs will rig it up in a very few minutes.

Obtain a piece of wood 12 in. long, 5/8 in. thick and 2 in. wide. One side must be planed level, and one edge, which will be the front, must be made perfectly straight. Next drive two short thin nails in this 8 in. apart, the outside of the nails to be exactly 1/2 in. from the front planed edge.

We now require a thin straight-edge (a 12-in. steel rule answers very well).

To operate, fold the first pleat, then lay the paper across the wood between the

nails, with the fold downwards and up to the front edge. Place the rule on top of the paper and press on the rule with the fingers, keeping the rule well up to the nails. Now turn up the paper to the edge of the rule with the thumbs. When creased take up and press between the thumb and finger. Now reverse the paper and continue in the same way, when a neatly folded diaphragm will result. B. S.

Making Catwhiskers

FOR use with crystals of the usual "ite" variety a catwhisker made of a small coil of springy copper wire is quite suitable.

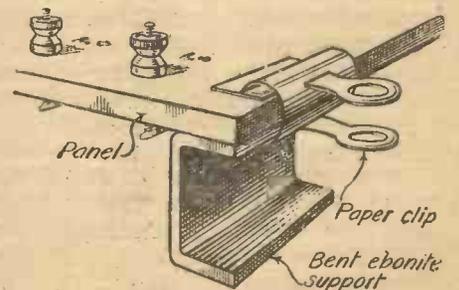
The efficiency of the catwhisker, however, can be much improved if the end of the wire coil is flattened out instead of being cut off short. The wire should be hammered out to the shape of a spear head, a sharp point being formed by cutting away the sides with a small pair of scissors.

It will be found that the strength of signals, especially from a distant station, will be greatly increased if this catwhisker is used. B. A. B.

Supporting the Panel

A VERY convenient method of supporting the panel for experimental purposes is shown in the diagram.

Small metal pieces shaped as shown, and of sufficient depth to allow the mounted components to clear the bench,



Convenient Panel Supports.

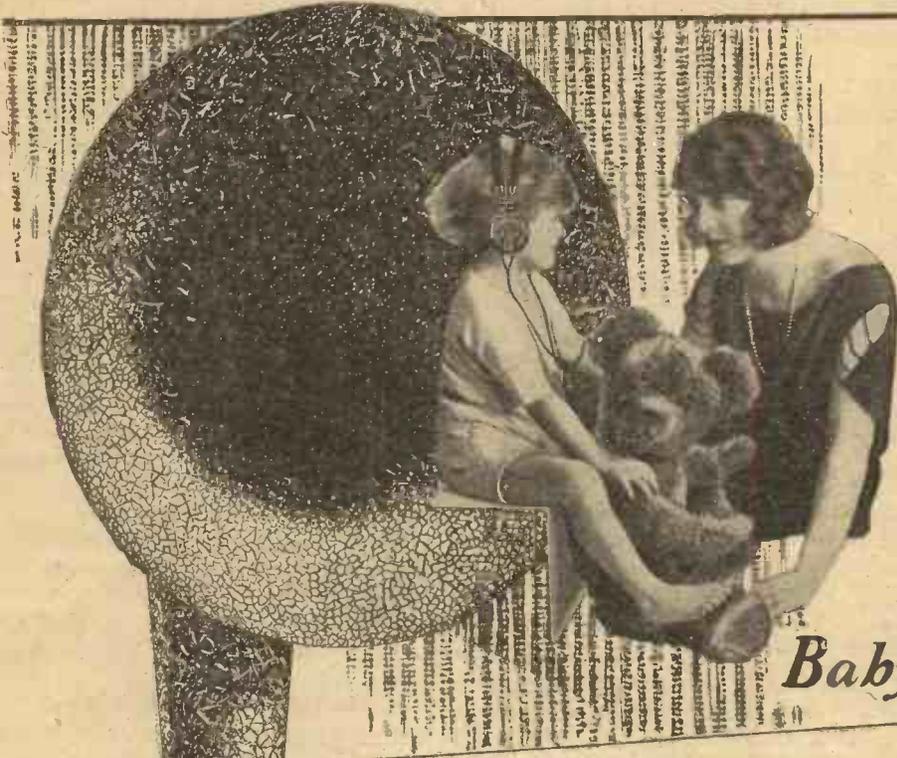
are held into position at the four corners of the panel by paper-clips.

This will be found a very handy method of mounting an experimental receiver where the wiring is constantly being altered, or for trying out a new set before it is mounted in its cabinet. C. F.

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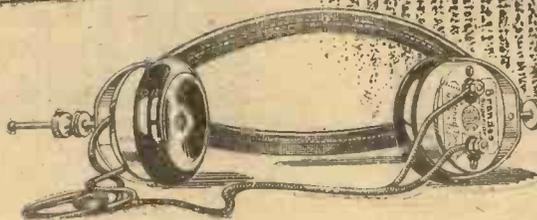
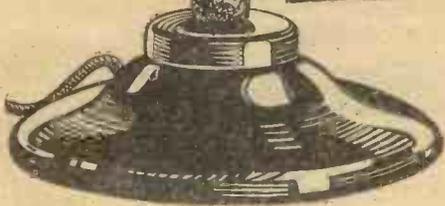
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Baby's Choice

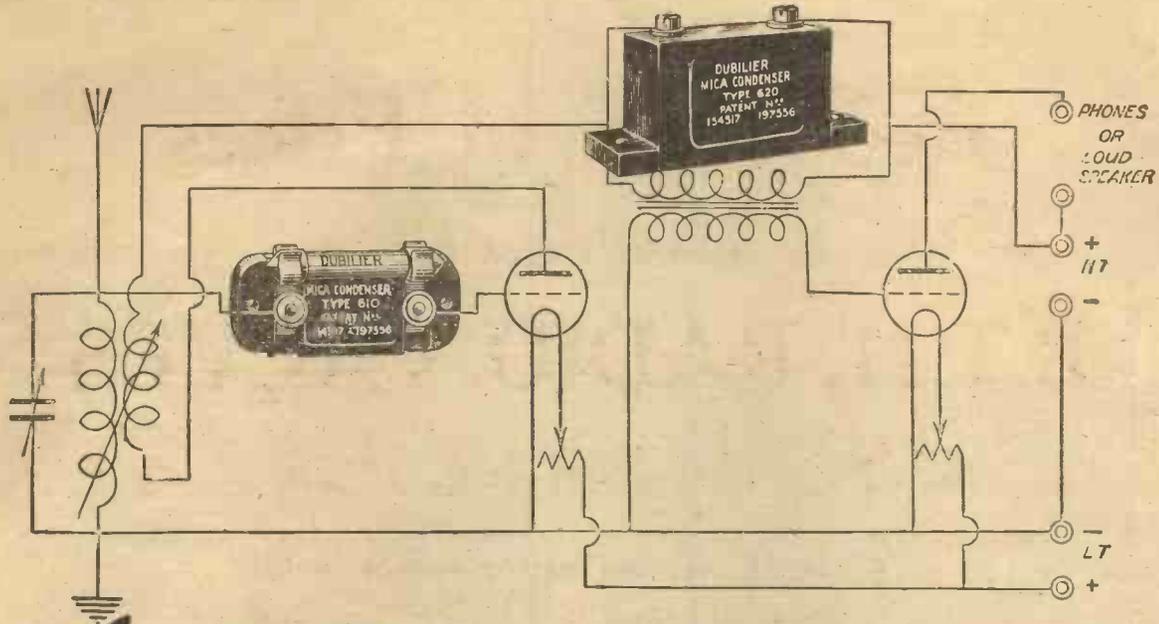
No longer will it be a problem to keep him contentedly amused—Brandes "Matched Tone" Headphones fit the tender head with ease and comfort, and the clarity of reception they ensure will enable him to grasp the Bed Time Stories with quick appreciation—and they are constructed to withstand his immediate curiosity to find "where the music comes from."

The *Table-Talker* speaks gently and most naturally to him. He is able to catch the kindly inflexion of the deep friendly voices and is enchanted. Get Brandes for the home—any good Dealer has them.

Table-Talker
42/-



Matched Tone Headphones
20/-



Little things that matter!

It has always been difficult to pick out the little things in life that matter. It takes accountants to find the little errors in accounts; engineers those little failures in a machine that mean so much; and experts to tell what is really wrong with an inefficient wireless set.

This last is always a troublesome affair; a number of very minor defects and mal-adjustments, each insignificant in itself, may together make a good set apparently useless.

For example: condensers, which are really essential in EVERY set, can, if defective, cause rapid exhaustion of H.T. Batteries, and in a grid circuit, they can prevent the grid from reaching its maximum efficient potential, thus weakening the signal strength.

It always pays to have the best, in Wireless as in everything else. That is why, for condensers for all purposes, it is wiser to

Specify Dubilier

Type 610
For all purposes of Wireless Reception. Fitted with screw terminals & detachable Grid Leak Clips.

Type 620
Similar to Type 610 but for vertical panel mounting.

In capacities of
0.0001—0.0009 mfd. 3/-
0.001—0.009 mfd. 3/6
0.01 mfd. 4/-
0.011—0.015 mfd. 4/6



Reduction in Prices

of all types of

B.T.H. RADIO VALVES

Effective May 6th, 1925

THERE are no better valves in all the world than B.T.H. Valves—and few (if any) as good. The substantial reduction in prices noted below will make the advantage of using B.T.H. Valves even more evident than it was before. They are made in the Mazda Lamp Works, Rugby.

TYPE	CHARACTERISTICS	OLD PRICES	NEW PRICES*
GENERAL PURPOSE TYPES			
R	Filament Voltage..... 4 Volts	11 0	8 0
	Filament Current 0.7 Amp		
	Max. Plate Voltage 100 Volts		
B 3	Filament Voltage 1.8 Volts	18 0	14 0
	Filament Current 0.35 Amp		
	Max. Plate Voltage 80 Volts		
B 5	Filament Voltage 3 Volts	21 0	16 6
	Filament Current 0.06 Amp		
	Max. Plate Voltage 80 Volts		
POWER AMPLIFYING TYPES			
B 4	Filament Voltage..... 6 Volts	30 0	22 6
	Filament Current 0.25 Amp		
	Max. Plate Voltage 120 Volts		
B 6	Filament Voltage 3 Volts	30 0	22 6
	Filament Current 0.12 Amp		
	Max. Plate Voltage.....120 Volts		
B 7	Filament Voltage..... 6 Volts	32 0	24 6
	Filament Current 0.06 Amp		
	Max. Plate Voltage.....120 Volts		

* The prices of Radiola Wireless Receivers and B.T.H. Amplifiers sold complete with valves are also reduced by corresponding amounts.



Advertisement of The British Thomson-Houston Co. Ltd.



Stations he had never heard before

AMONG bright emitters there is no Valve in the country which ever earned such bright praise for long-distance reception as the Cossor P2—the valve with the red top. Indeed it can be said—without fear of contradiction—that this Valve exerted tremendous influence in popularising long-distance reception. Before its introduction the reception of distant Continental Broadcasting Stations was a matter of luck. If conditions were favourable—if your aerial was efficient—if your Set was good, then you might reasonably hope to pick up Stations six or seven hundred miles away. But when the Cossor P2 was placed on the market long-distance reception became a matter of habit.

And now the same measure of popularity is being extended to the Wuncell Dull Emitter W2—also the valve with the red top. This valve is identical in characteristics with the famous P2. Wherever you have used a P2 with such excellent effect you

can replace it with the Wuncell W2 and get even better results.

Glowing at the dullest of red heat—practically invisible during daylight—the Wuncell consumes only .3 amps at 1.8 volts. With Wuncells your accumulators will last six times as long—in less than three months the Wuncells will have saved their extra cost in accumulator recharging alone. Unlike many other Dull Emitters there is nothing fragile about the Wuncell. Its filament—the only vulnerable part of any valve—is quite as stout as that used even in a Bright Emitter. As a result the Wuncell is becoming known as the *long life* Dull Emitter—the valve that should easily outlast several bright emitters.

Before buying any more valves think carefully how much you will save by choosing Wuncells—you save money on accumulator charging, you get a valve with almost indefinite life, and you get a valve with a reputation for pure tone, sensitiveness and volume which has never been equalled by any other Dull Emitter.

A. G. Cossor Ltd., Highbury Grove, N.5



Wuncell Dull Emitters

Types W1, W2 & W3

W1 is the Detector Valve, W2 (with red top) is the H.F. amplifier specially designed for long-distance use. W3 is the new Cossor Loud Speaker Valve. All function at 1.8 volts.

Types WR1 & WR2

To enable users of multi-valve Sets to try out Wuncells along with their existing bright emitter valves from a 4- or 6-volt accumulator, we are also supplying them with a resistance incorporated within the base. In all other respects the WR1 and WR2 correspond exactly to the W1 and W2. When not required, the resistances can be short-circuited and the valves operated at their normal voltage of 1.8 volts.

Important Reduction in Prices of all Cossor Valves

Bright Emitters :

Old price New price

P1	11/-	8/-
P2	11/-	8/-

Wuncell Dull Emitters :

W1	18/-	14/-
W2	18/-	14/-
WR1	20/-	16/-
WR2	20/-	16/-

Loud Speaker Valve :

W3	22/6	18/6
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These prices come into force at once.

— the long life Dull Emitter. Cossor Wuncell

On Your Wavelength!

A Wireless Air Raid

DID you hear the air raid from 2 L O during the special recruiting week? It was an excellent idea to broadcast it, and the whole thing was exceedingly well done. To me it was of particular interest, because during the war I had a long spell of "Archie" work. I understand that the broadcasting was done by the help of a special telephone line laid across Hyde Park, which was connected up to another line belonging to the police. Anyhow, it was a great success, and if it did bring back unpleasant memories to some people, it was probably a great help in inducing others to join up in one of the anti-aircraft brigades.

There is a project afoot for giving us yet another wireless impression of events as they actually happen. This is the broadcasting of the Derby from the Epsom race-course. All arrangements have been made by the B.B.C. to do this. The idea, I believe, is to move the microphone about amongst the crowd before the race begins so that the shouting of the bookies and the general babel of the race-course may be heard. Then during the race itself we are to hear the sound of the galloping hoofs at Tattenham Corner and the great roar which always goes up as the horses enter the finishing straight. This should be most realistic. One only hopes that the permission to broadcast will include leave to transmit the name of the winner. In previous years I generally heard the result within a few seconds of the race by tuning in one or other of the big Transatlantic stations which transmit press news.

A Correction

I must apologise for having stated recently that the first news bulletin had been abolished. An announcement was made that this was going to happen, but apparently at the last moment it was thought wise to continue to have the two patches of news as heretofore. This is, I think, a good thing, though personally I would like to see the first news bulletin put a little later, say at eight o'clock, and the second given at the very end of the evening programme. If this were done those who must necessarily go to bed early would be able to have their news and weather forecast, whilst others who sit up to a later hour would have information about important events occurring during the evening.

New Uses for Note Mags.

Quite a number of novel uses for low-frequency amplifiers have been discovered lately. One of the most interesting is the loud-speaker "porter" installed for experi-

mental purposes at St. Pancras station. The times of the arrival and departure of trains and the platforms on which they would be found were given out at intervals by a stentorian voice. Every word could be heard clearly, except at odd moments when engines were whistling or blowing off steam. But somehow the loud-speaker porter did not appeal to many passengers as a substitute for the genuine article. Porters in the flesh were plied with just as many questions as if the loud-speaker had not been at work at all. Travelling is a curious business; even the least fussy of us generally has to ask at least three uniformed officials before he is quite convinced that his train really does start from No. 6.

Another loud-speaker which was much more amusing, and I should think very effective, was installed outside a big cinema theatre in which a particularly funny film was being shown. As you walked past you were suddenly greeted with roars of laughter coming from the audience within. The idea was that people who had any doubts about the film would be reassured by hearing the cachinnations of those who were watching. This idea of giving wireless samples may be carried a whole lot further. We might, for example, be allowed to hear the expressions of wonder and joy of visitors to the Academy or the British Museum. Somehow, though, I do not think that the scheme will be used very widely by dentists!

Australia by Daylight

Mr. A. J. Simmonds, who has already been responsible for a great deal of good wireless work, was successful the other day in conducting two-way working with a couple of Australian amateurs in daylight hours. The exchange of signals lasted for nearly an hour and a half on the first occasion, and was resumed successfully on the following day, when many messages were exchanged. The wavelength used was a very short one, being only 20 metres, which means a frequency of no less than 15,000,000 a second.

The ultra-short waves seem now to have established their claim to be far more efficient than the long for transmission with small power over great distances. I believe myself that within quite a few years the very long-wave high-power stations now used for commercial work will have been converted to shorter wavelengths and smaller power. One point that interests me greatly as a dull-emitter enthusiast is that Mr. Simmonds' reception was done with the help of these economical little valves. I have always maintained that a good dull-emitter properly used is

in every way as efficient as a bright-filament valve, and this feat of reception seems to go a long way towards proving the truth of this assertion.

Wireless Debates

I see we are to have shortly from 2 L O the broadcasting of debates, which will take place before the microphone. This kind of thing should be very interesting provided that it is well done. The difficulty in these cases is to strike the happy mean between the spontaneous and the carefully rehearsed. If you do not rehearse to some extent and arrange more or less what the speakers are going to say, the thing is apt to fizzle out or to become hopelessly irrelevant owing to the debaters wandering off into side issues. On the other hand, if the whole thing is cut and dried by the time that the speakers come before the microphone, it sounds artificial and unconvincing. A case in point occurred some months ago, when an interview was given from the studio. Anything more hopelessly unreal I have never yet heard. Let us hope that in the case of debates only the general lines of the argument will be written down beforehand, so that those taking part will be able to give us something that sounds genuine.

Those Statics

Now that the thunder and lightning season is rapidly advancing, that old bugbear, static, will once again come to the fore, and those amateurs keen on D.X. will be faced with the installation of ways and means for exterminating this unwanted pest. There are many methods which it is claimed will do the needful, but it is questionable as to whether they are as efficacious as we are led to believe. These mostly comprise some form of wave-trap, but the latest proposal is to use an underground earth, that is, an earth contained in an insulated or earthenware pipe, the idea being to place the pipe below the level of the ground and to suspend an earth in this. Whether or not such an arrangement would have the desired effect it is difficult to say, but I am rather inclined to the belief that it merely weakens received signals and the statics also in proportion. It is, however, worth trying if the convenience exists, but in my case the lawn is sacred.

Secrets of Good Reception

Often when listening to an amateur who is conversing with another station whose signals are infinitesimal, so weak in fact that the eager "ether-dropper" cannot hear the replies even with two or three H.F. stages going all out, the would-be

On Your Wavelength! (continued)

listener wonders how it is done, for he knows that both stations are only using one note magnifier and a detector valve. In many cases efficiency is obtained by using well-designed coils and condensers with very short connecting wires of bare untinned copper. It is an improvement to bend these wires with the finger and thumb, the bends being nice easy sweeps and not sharp right-angle kinks. Furthermore, it is a good plan to have the grid condenser close to the grid terminal of the detector valve, actually on it if possible. Attention to these little points will often result in the reception of signals which have never been heard before, but no great increase in the strength of local station should be expected as a result.

"Hand-capacity" Effects

I am beginning to suppose that I am an exceedingly lucky person. Lately very many references to "hand" and "body" capacity have come to my notice, with various devices for getting rid of this most undesirable feature. Some, of course, are fairly old, like extension handles, and some are new. The point is that I don't have any of these tuning difficulties, which Captain Eckersley has so aptly described as "getting a station by keeping one hand on the A.T.C., another on the H.T.C., a third on the vernier, whilst a foot is kept on a copper bath and the nose pressed on the aerial lead-in"—or something like that, at any rate. At present I have three sets working excellently, one a four-valve, one a single-valve, and the other a two-valve specially designed to bring in very low-wave signals. There is no hand-capacity effect to be found in any of them and no special precautions to prevent hand capacity are resorted to, except that the moving plates of the tuning condensers are connected to the point of fixed potential—otherwise the earth.

I think the secret lies in having ample power, so that, in receiving telephony, the valves are nowhere near the point of self-oscillation. On the other hand, in getting C.W. there must be a "beat note" produced, and I don't get hand capacity when I am taking C.W. even as low as 90 metres. But I remember a pre-broadcasting two-valve set of mine that was a perfect beast. If I went to it with hair parted in a slightly different way from the usual it yelled in violent protest until I removed myself several yards from it. It certainly was a beauty. One wanted five hands and an insulated stool on which to stand to cope with it properly.

Panel "Engraving"

My best thanks to the genius who has invented what is known as the "hot-pad-transfer" method of marking radio panels.

Like most home constructors, when I am building a set I want to get right along with it and find out how it works. When it is working I want to keep it working. I certainly do not feel like marking out and drilling the panel and then sending it off to an engraver and waiting at least a week before it is returned. The consequence is that my panels have always had essentials marked on them with tiny scratches filled in with white paint. And the white paint soon rubs off, leaving only the scratches, which do not look very professional.

Now, by means of these transfers I can mark my panels with celerity and certainty. It is an operation that can be carried out on a completed panel, with all components in place, though it is easier with the panel stripped. It is a fascinating business. The transfers are printed on very thin paper, which is backed on to a thicker paper. You separate the thin paper from its backing, place it with the transfer side down on the panel, and then press hard on it with a hot soft pad. The pad can be made of a piece of old linen stuffed with cotton-wool or soft linen or wool scraps. It is held in front of a hot fire until it begins to scorch and then pressed on the transfer. The operation is repeated twice, and then the thin paper is rubbed off the panel with slightly warmed water, leaving a nice clean white label that makes any panel look as though it had come straight out of the factory of a first-class manufacturer.

A New Perikon Detector

Recently I have been experimenting with a combination of crystals, which is new to me, but which gives excellent results in mountings of the semi-permanent type. The crystals in question are tellurium and gillenheim, and they are marketed in various forms in detectors which are given attractive trade names. One of these names is Hovimo, and two others are Lion and Lion King.

As a straight crystal detector I find the combination very efficient when properly adjusted. It seems to me to give results as good as anything that can be obtained with the more ordinary catwhisker arrangements, and very distinctly better than our old friend zincite-bornite, which it resembles, in that two crystals are held in contact.

The chief usefulness of the combination would seem, however, to lie in its efficiency when used in crystal-valve circuits, either of the reflex or straight type. When used in such a way, the setting which gives maximum loudness is not the best for pure reception and is indeed inclined to be a little unstable. When the pressure between the crystals is a little heavier than would be used for straight crystal recep-

tion at maximum volume the detector can be left set for weeks without change.

Lest We Forget

As a nation we have got bad memories, I admit, but I am not sure that the calendar as a source of inspiration for programmes ought not to be forbidden. I don't see why we should be bored stiff with negro music because a certain composer of the same was born or died, as the case may be, nor flooded with slabs of heaviest type to celebrate the same occasions of other composers. Just give us some nice light music, B.B.C., and avoid looking at the cemeteries.

That Schoolboy Feeling!

I am afraid I shall not mourn if I do fail to tune-in to Belfast to-night, for though I have the greatest respect for Professor Gilbert Murray, whose translation of "Iphigenia in Tauris" of Euripides is to be performed by the Belfast Radio Players, I have too many uneasy recollections of being asked for "forty lines" from that same work to feel any further interest in the troubles of the unhappy heroine. I believe that the part is to be taken by Miss Flora Robson, who comes from London especially, and with Mr. Arthur Malcolm as "Orestes" I feel that I can leave them both in "abler hands than mine," as the novelists used to say.

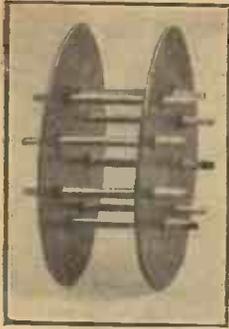
Something New

I like that idea of a "Pot-Pourri" programme at Plymouth to-morrow night with its visions of sweet-scented lavender and the dead rose-leaves, but I am equally curious as to what that Manning Organ Trio is like. Does it mean three organs played at the same time, or three players on one organ, and wouldn't either sound highly reminiscent of the itinerant musician outside my window at the present moment with an unprepossessing specimen of Darwinian man on the box.

"When the Sleepers Awaken"

Whether it is due to the work of the B.B.C., I don't know, but I don't hear of so many cases of insomnia now. My own idea is that they don the headphones, bump up against "My part of Camden Town," and go peacefully to sleep. No drugs or counting those sheep over the stile, you know, and "perfectly simple." Of course there are a few people unreasonable enough to prefer light music, but they are in the majority, and therefore to be ignored. I feel that I understand more fully the text that tells of more rejoicing over the goats than the sheep, and it is evident that it is a far, far better thing to have a thirst for Tchernin than Sullivan or German. THERMION.

MAKING YOUR OWN LOW-LOSS COILS



Coil Former.



Coil Partly Wound.

LOW-LOSS coils effect an improvement in any set apart from their valuable use in tuning in distant stations, and the writer has endeavoured to evolve a type which can be easily and cheaply wound and yet result in an efficient coil.

It will be seen from the illustrations that the wire is supported in this coil only at intervals and that a former is not necessary. The wire is therefore practically suspended in air, and this in itself is a most desirable feature. Shellac varnish is not needed for the coil, which should be quite robust. Any number of turns may be wound, the coil illustrated having sixty-five turns in four layers.

Formers

For the construction of the coil two circular discs, about 3 in. in diameter, which may be of stout cardboard well coated with shellac after being thoroughly dried in front of a fire, will be required, together with a number of good-quality matches, which should also be dried and coated with shellac.

The next step is to drill or punch holes in the discs of sufficient size to provide a tight fit for the matches, the number of holes varying according to the number of turns to be wound, eight being allowed for each layer. Fig. 1 shows a disc drilled with sufficient holes for four layers of wire, wound as shown in Fig. 2, but for a larger number of layers the holes for each layer may be closer or larger discs used, preferably the latter.

Winding

Matches should now be inserted in the inner eight holes of each disc, as depicted in the first photograph, a space of about 1 in. being left between the two discs, this being sufficient for the following number of turns of d.c.c. wire:

S.W.G.	...	No. of Turns
19	...	20.0
20	...	21.7
22	...	26.3
24	...	31.3
26	...	35.7
28	...	40.2
30	...	44.7

A length of about 4 in. should be left at the commencement of winding to connect to the coil holder.

When the first layer has been wound, the wire should be secured temporarily (by a spring paper clip or similar device) and the second eight matches inserted in

position for the next layer, this process being repeated (see second photograph) until the winding is complete. For a coil

comb coils. A further improvement is to stretch this banding over a further series of matches instead of allowing it to rest on the last layer of wire.

Finishing

The ends of the matches should next be cut off flush with the discs. In order to prevent the matches moving, it is advisable to give the outside of each disc another coat of shellac varnish, making sure that each match end is well coated. To make certain that the discs cannot come apart, a bolt through the centre connecting the two sides is desirable. A finished coil is shown in the third photograph. A neat finish may be made to the completed coil by covering each disc to hide the match ends.

This method of coil winding is particularly suitable where a very short-wave coil is required, but in place of matches the writer would recommend stouter pieces of wood or ebonite suitably notched so that bare wire may be employed. A. W. X.

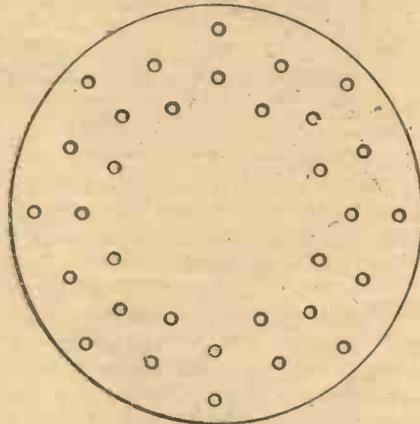


Fig. 1.—Disc for Former.

of 75 turns it will be seen that three full layers and one of ten layers will be necessary if wound with No. 20 S.W.G. d.c.c. wire.

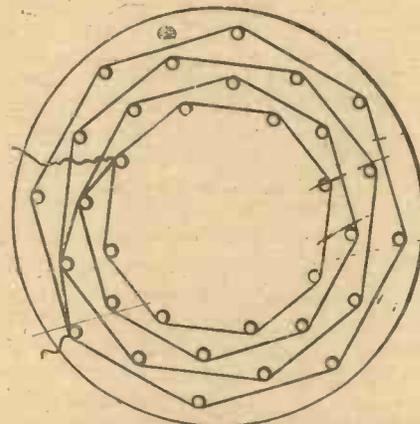
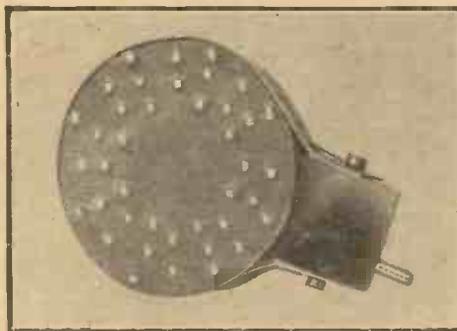


Fig. 2.—Method of Winding.

When the coil has been wound it may be secured to an ordinary coil holder by means of fibre banding, as used for honey-



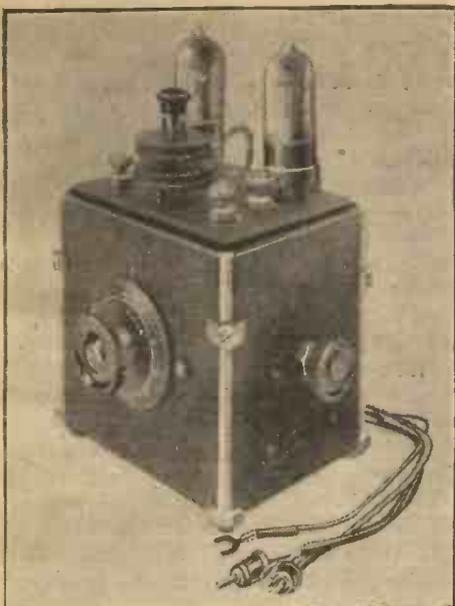
The Completed Coil.

REVERSED AERIAL AND EARTH CONNECTIONS

IN the case of a simple crystal circuit the aerial down-lead can be changed over to the earth terminal, and the earth wire connected to the terminal marked aerial, without making any appreciable difference either to the tuning of the set or to the signal strength. Of course if the telephones are normally on the earth side of the crystal, the reversed connections will place them at a high-frequency potential. This may result in some slight loss of energy through the shunt path to earth formed by the head and body of the listener, but the effect is hardly noticeable.

In a valve set, however, an interchange of the aerial and earth leads causes the batteries to "float" instead of being earthed as usual. In effect the battery capacity is added to the ordinary capacity of the aerial circuit. This not only makes a decided difference in tuning, but also prevents the full available signal voltage from being applied across the filament and grid, so that signal strength is reduced. An otherwise inexplicable alteration in the condenser setting necessary to tune-in to a given station, accompanied by a falling-off in volume, may sometimes be traced to this cause.

M. A. L.



The Polar Twin Receiver.

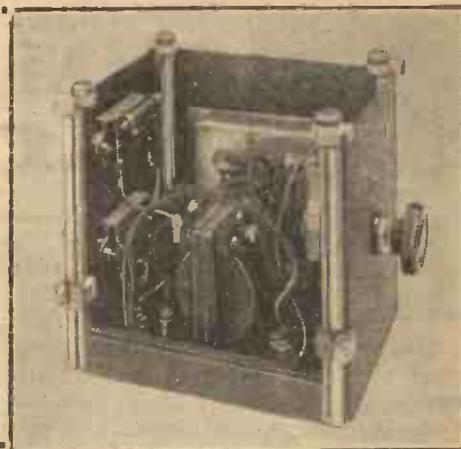
THE clumsy wooden camera with its lens-caps and dark-slides was the forerunner of the modern reflex camera. Similarly in wireless it was to be expected that something would be evolved which would overcome the defects of the present type of receiver with its wooden cabinet.

A step in this direction has already been taken by the Radio Communication Co., Ltd., of Norfolk Street, Strand, W.C.2, who manufacture the Polar Twin.

We have had the opportunity of testing this novel little receiver, which is neat in both appearance and construction, as the

THE TEST OF A TWO-VALVER

Details of the New Polar Twin Receiver



View of Interior.

photograph shows. A light metal framework forms the support for the set, four light panels being mounted in grooves at the side. Simple angle pieces are provided at each corner, so that the removal of any one panel is but the matter of a few seconds. An ebonite panel carrying the valves, coils and transformer is mounted at the top of the framework. The tuner is of novel design and can be plugged in at will. In conjunction with the Polar mica-dielectric condenser it is capable of tuning-in to all the low-wave broadcasting stations, while an extra unit is supplied for 5XX.

The rheostat is interchangeable for bright- or dull-emitter valves.

A preliminary test was made with the receiver at a distance of about half a mile from 2LO, no aerial being necessary to

bring in the transmission at good head-phone strength. On a short indoor aerial excellent loud-speaker strength was obtained. Birmingham (on the loud-speaker) and Bournemouth were received on an outdoor aerial.

The receiver was then taken twenty-five miles south of London to obtain a better test of its capabilities. At this distance, and on an outdoor aerial much shielded by surrounding trees, the receiver gave results equal to many three-valve sets we have tried. 2LO and Chelmsford were received with full volume on a loud-speaker, the tone being remarkably free from distortion.

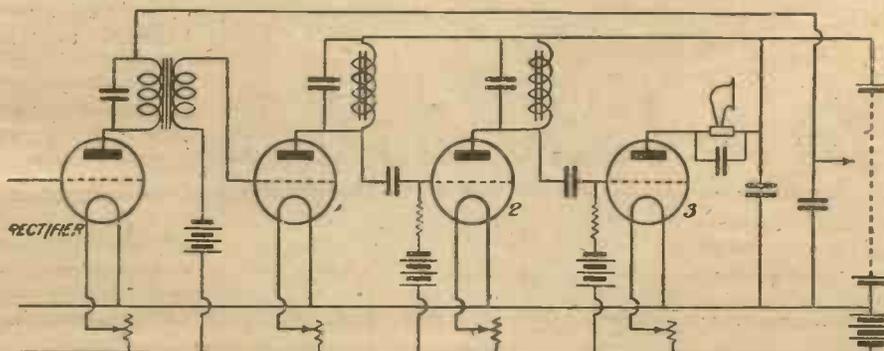
The ease and accuracy of tuning was particularly noticeable, the Polar condenser giving an even range and no hand-capacity effects were experienced.

A FINE COMBINATION

SEVERAL correspondents have asked me to give particulars of the note-magnifying combination which I described briefly in No. 149 in a paragraph of "On Your Wavelength." The theoretical diagram is given in the accompanying sketch. Really wonderful results can be obtained with the following combination of components. The transformer between the rectifier and the note magnifiers should be of good make, with plenty of wire in the primary windings. The Marconi Ideal, the Eureka and Radio Instruments transformers all answer excellently. For the chokes used between the first and second and second and third note magnifiers one can use the secondaries of large transformers, and the Lissen standard chokes do extremely well. The grid condensers

should have a value of about .025 microfarad, and it is desirable that the dielectric should be of the best-quality mica. I use "disposals" condensers, for which I paid two shillings a dozen. The grid leaks, which must be of the best quality if parasitic noises are to be avoided, have a resistance of 500,000 ohms. It is usually advisable to shunt both choke coils with a fixed condenser, whose value will depend upon the actual components used. In most cases it will be found that a suitable

value will be from .001 to .002 microfarad. The great advantage of choke coupling over resistance coupling is that the plate voltage is not cut in two—that is, if one applies 100 volts to the note magnifier H.T. positive busbar, the actual anode voltage is very little less than this figure. I use 120 volts for each of the last three stages, and with proper grid bias the anode current is cut down to reasonable limits. If bright-emitter valves are used the first two note magnifiers may be DE5B valves and the last LS5. Excellent results are obtainable with dull-emitters by using any specialised low-frequency valve in the first two stages and a dull-emitter power amplifier, such, for instance, as the DFAo or DE6, in the last valve holder of the combination. THERMION.



Circuit Diagram of Note-magnifying Combination.

Good News for Wireless Users

ANOTHER BIG REDUCTION IN THE PRICES OF WIRELESS VALVES

Greatly increased demand and improved methods of production have resulted in reduced manufacturing costs of

MARCONI VALVES

MADE AT THE OSRAM LAMP WORKS

In accordance with the established policy of the manufacturers, the benefit of a substantial reduction in the prices of these Valves is accordingly offered to the public. The great resources behind the names MARCONI and OSRAM are your definite assurance of highest quality and outstanding performance.

REDUCED PRICES.

For 2-Volt Batteries				
TYPE	DESCRIPTION	OLD PRICE	REDUCED PRICE	
D.E.R.	General purpose	18/-	14/0	
D.E.6.	L.F. Amplifier	22/6	18/6	
For 4-Volt Batteries				
R.	General purpose	11/-	8/0	
D.E.3.	General purpose	21/-	16/6	
D.E.3.B.	L.F. Amplifier (for resistance capacity)	21/-	16/6	
D.E.4.	L.F. Amplifier	26/-	22/6	
For 6-Volt Batteries				
R.5.V.	General purpose	11/-	8/0	
D.E.5.	L.F. Amplifier	30/-	22/6	
D.E.5.B.	L.F. Amplifier (for resistance capacity)	30/-	22/6	
LS.5.	L.F. Amplifier	50/-	40/0	

Sold by Wireless and Electrical
Dealers, Stores, etc.



Ask for the Value in the Purple Box!

Advertisement of
The GENERAL ELECTRIC Co., Ltd. The MARCONIPHONE Co., Ltd.
Magnet House, Kingsway, London, W.C.2. Marconi House, Strand, London, W.C.2.

An apology

is offered for the error appearing in the announcement of the House of Graham in "Amateur Wireless" of May 2nd whereby the

"Swan Neck" AMPLION type
AR 15 at ... **£6 - 0 - 0**



AR 15

was illustrated but described as the

"New" Junior-De-Luxe
AR 114 at ... **£3 - 5 - 0**



AR 114

both these models are popular types of

The
World's
Standard

AMPLION

Wireless
Loud
Speaker

THE RECTIFIER OF THE FUTURE

A natural mineral.
Unaffected by heat.



Hard as a diamond.
Crystal can be set in solder.

EVERY CRYSTAL TESTED ON BROADCASTING AND GUARANTEED.
This crystal is a natural product and not a compound. Being as hard as a diamond it will never wear out and thus avoids the constant trouble of turning in order to get a good point. Giving perfect results, it now means that the crystal will last longer than your set. There are other cheaper crystals to be obtained, but the cheapest is the one that gives best service for the money. Every user of a crystal set should send for one to-day.
Unsurpassed for crystal reception.

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Everlasting on reflex circuits.

If your local dealer does not stock write direct to—

MIKRO LTD., 32(A) CRAVEN STREET, W.C.

DON'T BE PUT OFF WITH A CHEAP IMITATION—YOU ARE THE USER

THE TROPADYNE "SUPER"—II

Constructional Details of the Latest Super-heterodyne Receiver

Components

HAVING now completed making up these parts, the following additional components are required:

Four mica dielectric variable condensers, .0005 (for the L.F. transformers referred to if not already obtained); two .0005 variable air-dielectric condensers; one low-

cabinet; and ½ lb. No. 20 d.c.c. wire for frame aerial; six Cossor valves (Wuncell).

The Loop Aerial

Fig. 8 (next page) shows a suitable construction of frame aerial for broadcast reception. This may be easily made up by the amateur from the diagram given.

other with a common feed wire. This wire should be attached to the filament sockets before the latter are finally screwed to the baseboard.

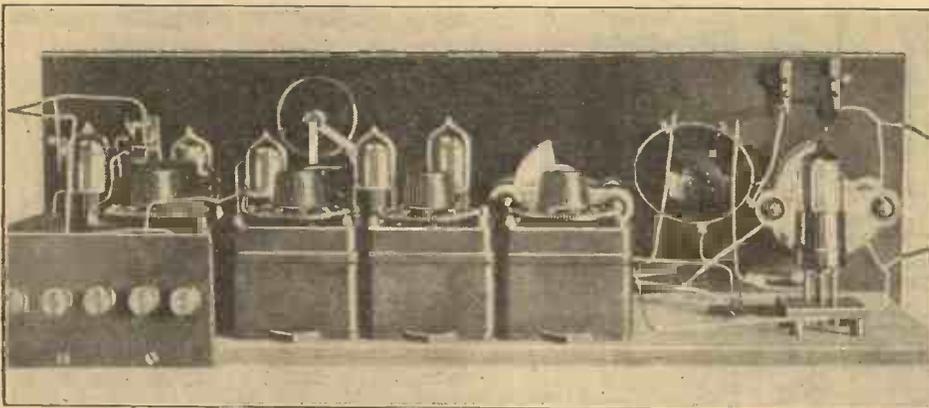
Wiring

The theoretical wiring diagram is shown in Fig. 9 and the values of all components are shown thereon. In wiring, as little flux and solder as possible should be used. Use the binding nuts and washers on the terminals of accessories wherever possible.

First wire up the baseboard components. Commence with the oscillator end of the board and wire the filament circuits first, keeping all main L.T. leads in front of the sockets as shown in the photographs. The H.F. transformers and H.T. circuit should be wired next. It is a good plan to engage the requisite short lengths of wire behind the transformer terminals making the B + leads to the H.T. battery assume a vertical position with a short forward projecting tag sufficiently long to solder to the main H.T. feed wire. This wire will then be slightly raised above the level of all other wires, and will be out of the way. Next the grid, filament and plate leads on the transformers are wired as indicated. It will be noted that all these wires are very short. Finally the L.F. transformer and five battery feed terminals at the rear of the set are wired up, remembering throughout this wiring that the leads have in some cases to go to the jacks on the panel and therefore they must be sufficiently long to reach those components.

Fitting the Panel

The panel has now to be wired up. Remember in this case also that the leads have to join others, so allow ample wire for these connections. The jack-to-filament wires are the only ones on the jacks



View of Back of Panel of Tropadyne Super Receiver.

frequency transformer (a Royal is used in the illustration); two filament rheostats; one potentiometer, 300 to 400 ohms (this should be very robust); one .0003-microfarad fixed condenser (grid condenser); two .0005-microfarad fixed condensers; one .003 to .005 fixed condenser; two Apex vernier dials; one dial for oscillator coupler (not more than 3 in. in diameter); two grid leaks (.25 to .5 megohms and 1.5 megohms); one single-circuit jack; one five-point jack; five brass terminals (large); sixteen small terminals (for H.F. transformers); five or more small terminals for oscillator coupler; about 50 ft. tinned No. 16 copper wire for wiring up; sundry odd brass screws and wood to make

Mounting the Components

Fig. 2 shows the layout of the baseboard. It should be marked out in pencil on the wood; the relative positions of the parts are clearly indicated. After this the components should be screwed in their respective positions and the variable condensers, Apex dials, oscillator coupler, rheostats, potentiometer and jacks, etc., fitted to the panel. As regards the valve sockets on the baseboard, it will be noted that the second and third and fourth and fifth valves are paired as regards position. This is done in order to conserve space; the positive terminals of the filament sockets of each pair of holders are wired together so that the holders butt on to each

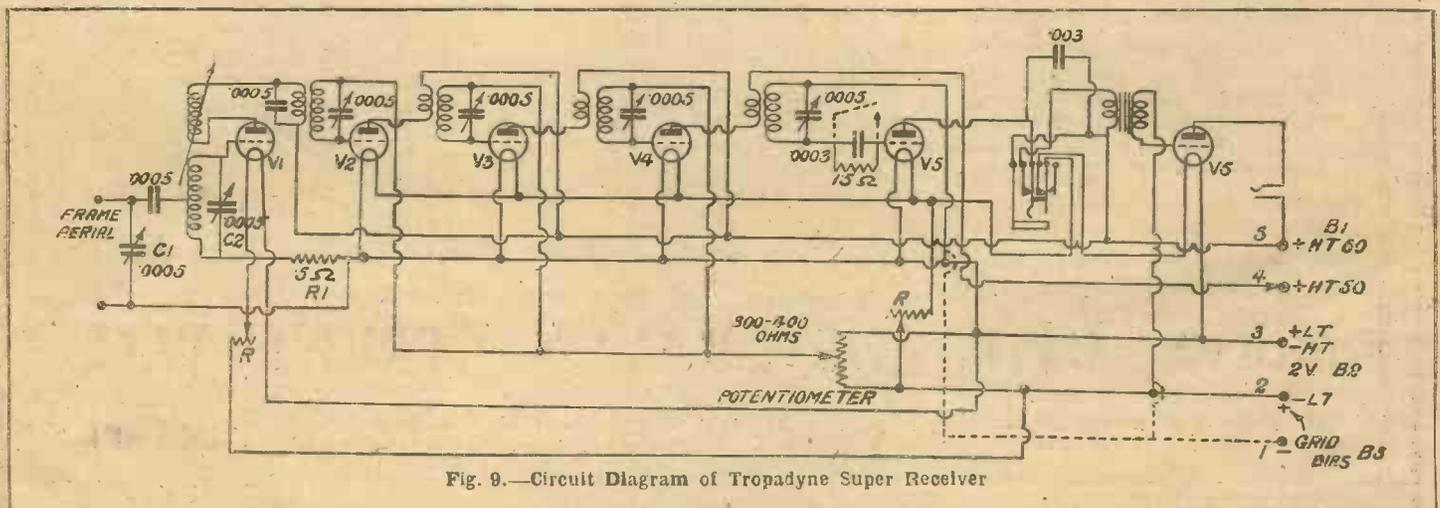


Fig. 9.—Circuit Diagram of Tropadyne Super Receiver

which go to the baseboard; all the others are fed from the L.F. transformer and terminal panel. After wiring, it will be found that before connecting up to the baseboard, the panel will have to be fitted and the filament wires on the baseboard slightly adjusted so as not to short-circuit the two filament rheostats.

instrument is given in Figs. 10 and 11. It is composed entirely of $\frac{3}{8}$ -in. and $\frac{1}{4}$ -in. fretwood. Oak was used in the model shown in the photograph. The little $\frac{1}{2}$ -in. square supports to which the boards are screwed and glued are obtainable ready-made from Messrs. Hobbies. The completed set should on no account be left

these proved eminently satisfactory. With a 2-volt cell the current consumption of the six valves was about 1.8 amperes.

The Tuning Inductances

The set described was designed for use with a frame aerial and no tuning inductances are required; but should the constructor so desire he may adopt it for use on the outdoor aerial by the addition of a pair of inductances wound on 3-in. ebonite formers. Fig. 12 gives details of suitable coils, and the ends of the windings are lettered to correspond with the insertion of the coil in the circuit in the manner illustrated in Fig. 13. There is insufficient room for the inclusion of this coil in the set so far described, so that it will have to be mounted in a separate cabinet.

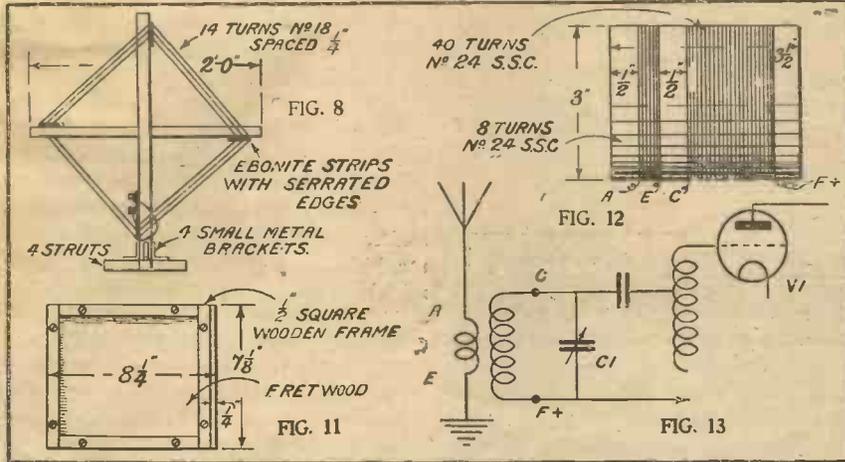


Fig. 8.—Frame Aerial. Fig. 11.—End of Cabinet. Fig. 12.—Inductance for Outside Aerial. Fig. 13.—Circuit for Outside Aerial.

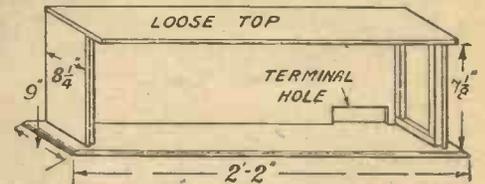


Fig. 10.—The Cabinet.

The panel may now be fixed to the baseboard and the wiring completed, after which it should be carefully checked for accuracy and possible short-circuits. A pair of flexible leads are attached to the tuning condenser C1 and the positive filament terminals, and these are led through two holes in the side of the case for connecting up to the frame aerial.

uncovered or dust will speedily render it unusable.

Valves

Some trouble was experienced with the set when it was first built on account of the heavy consumption of current by the six valves. A mixed lot of bright-emitters were tried, but the current consumption was from 3 to 3.5 amperes per hour. Ultimately a set of Cossor Wuncell valves with anti-capacity bases was obtained, and

The two flexible leads on the tuning condenser and filament wires should be taken to a pair of terminals on the face of the panel and a wire provided between these and the cabinet containing the inductances.

The set will not radiate and will not therefore cause interference if used in this manner, but it will be found that interference from static, etc., will be experienced when working on the outside aerial. (To be continued) A. J. C.

The Cabinet

A simple scheme for a cabinet for the

GET THE RIGHT VALVE

WHEN buying a valve there is something besides filament voltage and current and price that should be taken into account—that is the use to which the valve will be put. By this is meant the position that it will occupy in the circuit and the work that it will be required to do.

Normally valves are used in three positions: (1) For high-frequency amplification, (2) for detection or rectification, and (3) for low-frequency amplification. In these days of "super-hets" valves used purely as oscillators might be added as a fourth class.

Special Designs

Whatever the position that it takes in a circuit, the valve should be designed specially for that particular function if the best results are to be obtained. For instance, besides being bad practice, it is inefficient to use a high-frequency amplifying valve as a detector. Nowadays manufacturers make special valves for each particular function.

To the broadcast listener it may seem that all valves are exactly alike, and he

may wonder how one can be a better low-frequency amplifier than another. The reason is that in every different type of valve the electrodes—that is, the filament, the grid and the plate or anode—are spaced differently (as a close examination will show).

Difference in Valves

In some valves the grid is nearer the filament than in others; similarly the plate may be nearer the grid. Further than this, the form of the electrodes themselves may vary. The spirals of the grid may be more open in one type of valve than in another. If you want to get the best possible results from your set, always buy the valve recommended by the manufacturer for the particular purpose for which you need it. G. W.

The number of licensed sets in Germany is approximately 800,000, but the total is increasing so rapidly that definite figures are not yet available. The revenue derived from this source last year was about £4,000,000, of which one-half was retained by the Government and the other paid over to the broadcasting companies.

TELE-DIAGNOSIS

IN flattering imitation of an experiment made some time back at the B.B.C. Cardiff station, the Eiffel Tower recently broadcast a lecture given by a well-known Paris medical specialist, Doctor Lutembacher, in the course of which the heart beats of several patients were put "over the ether." Apparently the experiment was a very successful one, as *Paris-Radio*, the wireless journal responsible for this demonstration, received many hundred letters from medical men in France, Belgium, Switzerland and Holland, who, in most instances, stated that they were capable of definitely diagnosing by this means the various cardiac diseases from which the patients were suffering.

Further experiments of a similar nature will be carried out at the Eiffel Tower in the immediate future. J. G. A.

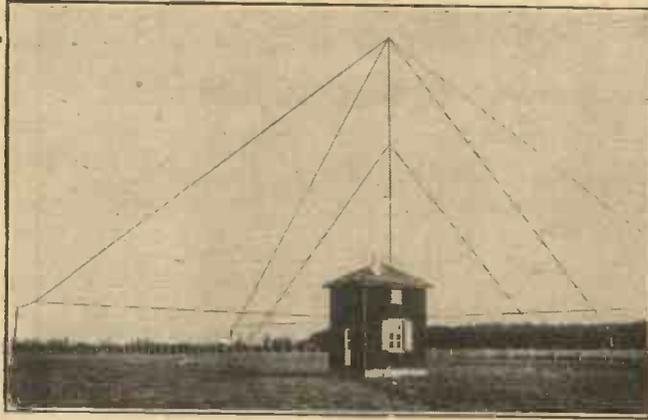
The ceremony attending the recent launching of the U.S. *Saratoga*, the first line airplane carrier, was broadcast by WGY, Schenectady; WJZ, New York, and WRC, Washington.

WIRELESS AND THE AIRWAYS

THE value of wireless in modern navigation has again been demonstrated during the recent involuntary flight of the R33. Its use saved many hours of anxiety and may be said to have ensured the safety of the giant airship and its crew. Wireless direction-finding stations at Croydon, Pulham and Amsterdam took readings of every message that the R33 sent out, and within two minutes those readings were at Major Scott's command at Pulham.

Upon a rapid and efficient means of communication between aeroplanes in flight and the air ports, and between the air ports, depends the success and efficiency of any organised aerial service.

The latest aerodrome to be equipped with wireless apparatus is that at Basle, which is controlled by the Basle Aviatric Co. and is the port of call for several important international services. The photo-



The Wireless Station of the Basle Aerodrome.

graph on our cover shows the aerial system of the transmitting station, and that on this page the receiving station. The apparatus, which is of the very latest design, has been manufactured by the Marconi Company, which company was also responsible for equipping the air ports at Croydon, Geneva, Brussels, Rotterdam, Cologne, and in Roumania and Greece. It is adapted for telegraphy, telephony and direction-finding.

The transmitter is a 1½-kilo-watt-type U set, in which three valves are used for telegraph transmission and five for telephony. The normal range for telephony is about 230 miles. For aeroplanes the normal telephonic range is from 100 to 150 miles, but instances are on record of aeroplanes being able to hold conversations with air ports at distances of over 400 miles. Aeroplanes are able to speak to each other while travelling at high speed, under favourable conditions, over an average distance of about 50 miles.

By means of a small switchboard in the wireless receiving room of the aerodrome the operator is able to control the transmitting station at a distance, and if required can also connect the local telephone system direct to the transmitter. In this way the whole of the wireless communication of the aerodrome, both transmitting and receiving, can be centred in one room.

STRUCK BY LIGHTNING!

A PERSONAL EXPERIENCE

I LIVE in the country twenty-five miles south-west of L O, and about 12.30 p.m. (noon) on Tuesday, April 28, I was ether-searching, using three valves, and listening intently, phones on head, for the slightest whistle of a carrier wave. There was not the smallest suspicion of atmospheric disturbance as I manipulated the knobs slowly and carefully. Suddenly all round me there was a blinding flash—I was told there was a loud noise as well, but all I noticed was the huge "spark"—and immediately afterwards a smell of burning. Realising what had happened, I quickly connected the aerial to earth in case of a second flash. In doing so, I noticed that the earth wire had come away from its terminal, and that stuck to the terminal was a blob of molten metal.

The Damage

When I examined the set afterwards I realised the current must have passed straight through the aerial circuit to earth without damaging the other part of the set in any way. The aerial coil was quite all right; it must have presented an easy path to earth, but the condenser across it had been considerably damaged. A soldered

connection had been melted and had fallen apart, several of the plates had been partly melted away, and a three-plate vernier, fitted to the condenser, had had its movable plate partly melted and thus welded on to one of the fixed plates.

The sudden flash had simultaneously destroyed all the electric-light fuses in the house; some of these were hurled across the room, as was also the door of the fuse-box, and one of the lamps was smashed into a thousand pieces and evenly distributed over the floor. The telephone was also found to be out of order. The two electric-light meters—light and power—were ruined.

Some Peculiarities

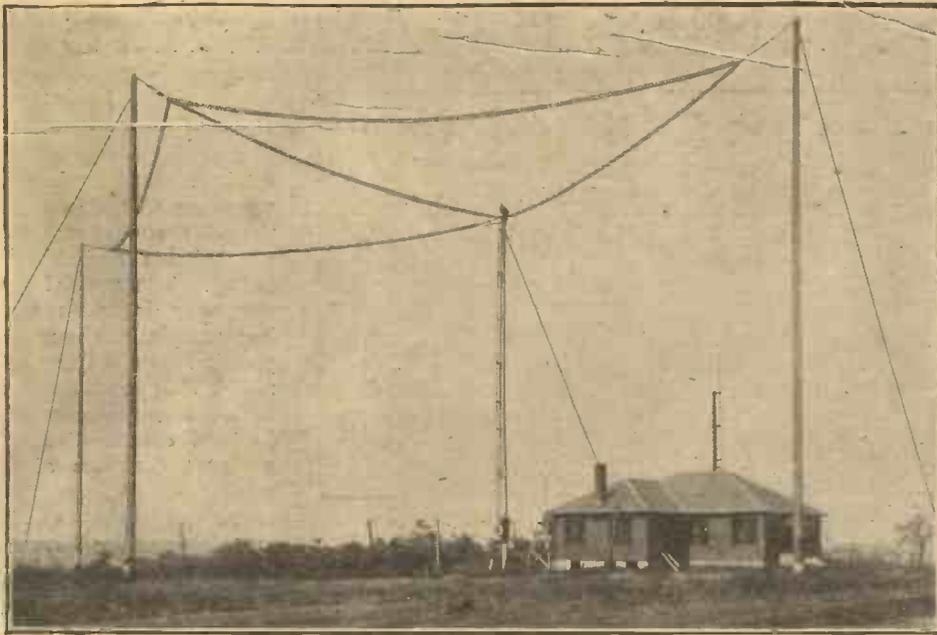
Whether or not I had a very narrow escape I cannot say. Only the aerial circuit in the set was damaged, none of the valves or transformers being injured, and even the phones appear to be in perfect order. I myself did not feel the slightest shock. The aerial itself is perfectly in-

tact, and I can say that the aerial was obviously not the source of all the trouble in the house, for the two other houses in the vicinity, which have no aerials, were affected if anything worse than was ours, I may mention that all the houses in question have two overhead services—the main electric supply and the telephone. Later in the day, when listening on another set—the little Polar two-valver, quite a wonderful loud-speaker set for both the London and Chelmsford transmissions—slight atmospheric were still heard, but these completely died away by about eight o'clock. L. R. J.

[The above is an account of damage done by lightning in the Editor's home. The initials of the writer (L. R. J.) are those of his son.]

In Scotland the Norwegian station of Oslo seems to be about the best Continental broadcaster. The transmissions are of exceptional strength and clarity, whereas Chelmsford fades perceptibly at times. On the other hand, Madrid, which used to be a great favourite up North, is not nearly so good as formerly. The Eiffel Tower is still heard very well.

Ask "A.W." for List of Practical Money-making Books



The New KDKA Transmitting Station at East Pittsburgh.

THE new home of KDKA is a mile from the East Pittsburgh works of the Westinghouse Electric and Manufacturing Co., which operates the station.

As consistent reception is possible over greater distances by the use of short waves, it is the short wave that has been used recently to transmit programmes half-way around the globe. The programmes have been regularly relayed every day for a time by stations as far distant from Pittsburgh as Australia, New Zealand and South America, as well as Europe and South Africa.

Short-wave Work

The use of metal was eliminated wherever possible in the construction of the new building at East Pittsburgh in order to reduce the possibility of energy losses to the minimum. A composition roofing is used, and all metal circuits and pipes are kept as near the ground as possible. Wooden poles, nearly 100 ft. high, are used to support the various types of aerial.

The short-wave aeriels are located with the idea of getting effects on the long-distance broadcasting. They consist of copper tubes supported vertically on the high wooden poles to the right of the building, with a small horizontal counterpoise element at the lower end of the poles. Only one of these aeriels is coupled to the transmitter. The others are situated at certain predetermined distances from the main aerial. Their purpose is to give the directional effects to the short-wave

transmitting, as when two of the aeriels are separated by a distance of exactly a half wavelength, the signal has maximum strength at right angles to a line between the two aeriels, and a minimum in the direction of a line intersecting the two. In the case of two aeriels separated by a quarter of a wavelength, the condition is just reversed. Any of the non-coupled aeriels can be made inoperative by breaking the continuity of the upper and lower sections of the copper tube.

Power Supply

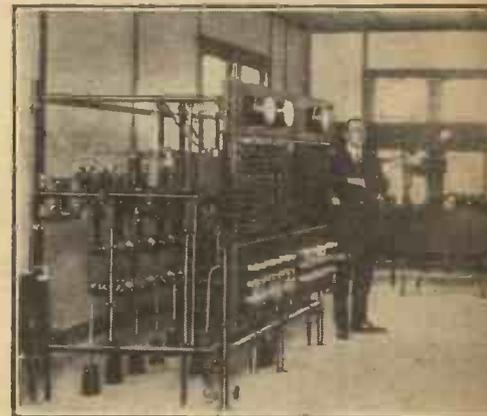
To ensure the great power necessary for the operation of this station, the company supplying the electrical power has established a regular sub-station in the basement of the building. The sub-station is supplied by two feeder lines from two different power circuits fed by two generating stations, thus guarding against the possibility of interruptions to the service during broadcasting.

The building contains offices, control room, experimental room and a large apparatus room, the studios being located elsewhere.

THE NEW K D

On account of its short-wave long-distance best known broadcasting stations in the nations here presented are based upon "Amateur Wireless" by the owners and Manufacturing Company

The short-wave and the long-wave transmitting apparatus are located at opposite ends of the apparatus room. In the centre there is a 20-kilowatt short-wave transmitter designed for operation on approximately 45 metres and to be used largely for unmodulated, or telegraph, signals.



The Long-wave and Short-wave

Along the wall in the rear are two large rectifier panels, each backed by 150-kilowatt transformers, while an additional bank of transformers may be switched in.

The apparatus used for the world-wide sending is of the short-wave type, and is located at the right-hand end of the room.

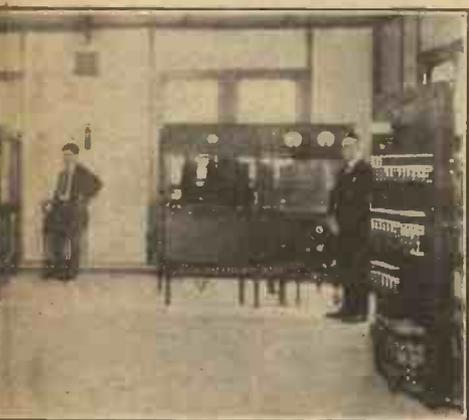


Members of the Band Frequently He

HOME OF KDKA

Since transmissions, KDKA is one of the world. The descriptive text and illustrations of KDKA, the Westinghouse Electric Company, East Pittsburgh, U.S.A.

The short-wave transmitting apparatus consists of oscillators and a modulator, a rather simple looking arrangement, but one developed by careful experiment over several years. The valves used are of the copper anode water-cooled type, each capable of handling 10 kilowatts. At the



Short-wave Transmitting Apparatus.

present time four of these valves are in parallel, and each is operated below its rated point. The cooling water is provided through spirally-wound coils of rubber hose. The condenser is at the rear, and consists of two large brass pots, having Pyrex glass covers, with smaller pots



Band in the KDKA Transmissions.



The KDKA Studio.

in the large ones, the whole being filled with oil. Just above the condenser is the helix, of the copper ribbon type wound on Pyrex supports, the supports being mounted on a wooden frame. The grid and plate coupling condensers are just behind the valves.

A large amount of experimental work was necessary to find the proper glass to use for the valves for the high-power oscillators, as the glass first used often melted when in the radio-frequency field. The oscillator frame is alongside the modulator frame, which holds six valves, with facilities for doubling the number. Any valve can be switched out instantly and another switched in. Beside the modulator frame are the bias control and meters for registering grid current and grid voltages.

The long-wave modulator and oscillators at the opposite end of the room are similar to the short-wave apparatus, but are tuned to different wavelengths. This transmitter can be operated on powers up to 50 kilowatts.

Long-wave Aerial

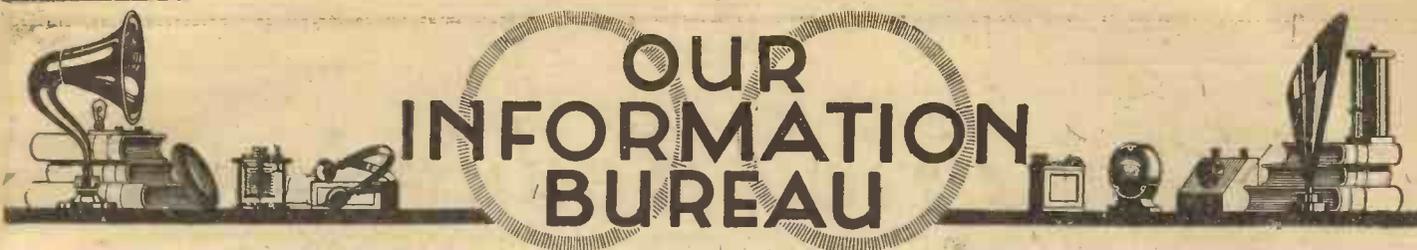
The aerial for

the 309-metre or long-wavelength set covers quite a large area. It is supported on 95-ft. wooden poles located so as to form a diamond-shape figure. A cage aerial leads from the one nearest the building to each of the other three, which in turn are tied together. This with a somewhat similar counterpoise about 10 ft. above the ground comprises the aerial system.

A copper tube running up the main pole connects the top and counterpoise through an inductance coil. This copper tube is very rigid and, together with the use of the wooden poles, helps to maintain a constant wavelength. A further reduction of losses is secured through the method of coupling the aerial and transmitter, which does away with the necessity of carrying the main aerial circuit into the transmitter and increases the radiating efficiency.

In the basement of the building are two gigantic motor generators, to supply filament current for the apparatus in the room above; each generator is able to supply approximately 800 amperes. The water-cooled valves require from 50 to 55 amperes each as heating current, and there are sixteen or more valves in some of the sets. Transformers, battery-charging generator, heating plant and other necessary equipment also are located in the basement.

The KDKA studio remains in its location in a building at the East Pittsburgh works. Wire circuits link up the station with other studios located at convenient places about the city.



OUR INFORMATION BUREAU

RULES.—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details. Ask one question at a time to ensure a prompt reply, and please put sketches, lay-outs, diagrams, etc., on separate sheets containing your name and address. Always send stamped, addressed envelope and attach Coupon (p. 809).

Trouble with Dull-emitters

Q.—I have a four-valve set consisting of one H.F. (tuned anode), detector, and 2 L.F. valves, working a loud-speaker. At times I am troubled with a peculiar booming noise which starts as a faint hum but quickly increases in strength until it drowns reception. If the set is then switched off and on again the trouble ceases for a while but not for long. My valves are dull-emitters of the .06 type and the loud-speaker an Amplion Junior. Can you tell me to what the trouble is due and how it may be cured?—D. L. P. (Plymouth).

A.—This trouble is not uncommon. It is caused by a peculiar L.F. reaction effect, not, however, of the electromagnetic variety. What happens is this: The sound waves from the loud-speaker cause the valves to vibrate, and this produces microphonic currents which are amplified by the succeeding stages, finally appearing as fresh sound waves issuing from the loud-speaker, and so the "vicious circle" is established and the sound builds up into the strong booming note above noticed. The obvious cure is to break the "reaction" chain somewhere. This is not usually easy to do, but one or more of the following expedients may be found effective. Direct the loud-speaker horn away from the valves or shield the valves, especially the detector, from the sound waves (it often pays to use a bright valve as a detector in such cases). Use one of the special resilient type of valve-holders now on the market. Alter the natural vibra-

tory period of the valves by slipping a tightly-fitting tube of cardboard over each (I have found some types of round valve boxes of use.) Stand the loud-speaker on a separate table or on a thick piece of felt so that the vibrations of the loud-speaker diaphragm cannot be transmitted back to the set through vibration of the table, which might happen if the set and speaker both stood on the same table.—J. F. J.

Saturation Point

Q.—What is meant by the saturation point of a valve?—I. T. (Durham).

A.—By this is meant the top bend of the characteristic curve. It is the condition reached when, with a given filament current and H.T. voltage, no increase in the plate current takes place when the grid of the valve is made more positive.—J. F. J.

Theoretical Crystal Symbol

Q.—In theoretical circuit diagrams the crystal contact is represented by a small triangle, one point of which touches a short straight line. Can you tell me whether the triangle or the line represents the crystal? It would be useful to know this so that a glance at the circuit diagram would show which way round it is intended that the crystal detector should be connected.—P. I. S. (Sutton).

A.—The triangle represents the *pointed contact*. In the old days, when carborundum was in almost universal use, a pointed piece of carborundum made contact with a flat

strip of steel or brass and the triangle was a rough representation of the carborundum crystal, while the metal strip was represented as a straight line. Now, however, when a catwhisker type of crystal is used, the triangle represents the catwhisker and the straight line the crystal.—J. F. J.

Gas-pipe Earths

Q.—I understand that the objection to using a gas-pipe as an "earth" is that an explosion might be caused in the event of the aerial being struck by lightning. Does this apply in the case of an indoor aerial, which is not more likely to be struck by lightning than the gas-pipe itself?—E. R. (S.W.4).

A.—It is quite true that an indoor aerial is not likely to be struck by lightning, but there is another objection to the use of gas-pipes as "earths" and that is on the score of efficiency. Gas mains are generally of iron, one section being screwed into the next. To ensure gas-tight joints it is usual to fill the threads with white-lead, which is an insulating material, so that the resistance of a gas-pipe earth is likely to be very considerable. When the continuous lead piping in the house is extensive, good results can often be obtained by connecting the earth terminal of the set to a gas bracket, but in this case the house piping is acting as a counterpoise and not as a true "earth." In general, therefore, it is advisable to leave gas-pipe earths alone.—J. F. J.

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MR. ROBERT RADFORD



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A.R. D.E.	18/-	14/-
A.R. '06	21/-	16/6
P.V.1	35/-	22/6
P.V.2	35/-	22/6
P.V.3	22/6	22/6
P.V.5 D.E.	30/-	22/6
P.V.6 D.E.	22/6	18/6
P.V.8 D.E.	30/-	22/6

These price reductions bring Ediswan Valves within the reach of all. Ask your dealer for particulars, or write:—

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First Made
—and Still
the First
VALVES

THE EDISON SWAN ELECTRIC CO. LTD.,
123, QUEEN VICTORIA STREET, LONDON, E.C.4.

AROUND THE SHOWROOMS

The R.I. Aerial Inductance

FOR some time past it has been recognised that difficulty is experienced by amateurs in obtaining efficient results with plug-in coils covering a wide range of wavelengths. To overcome this difficulty Radio Instruments, Ltd., of 12, Hyde Street, W.C.1, have designed a precision inductance covering a wavelength range of from 175 to 4,000 metres with efficient variable reaction over the entire band.

This unit comprises a cylinder, on which is wound a number of turns of d.s.c. wire, with eight tapping points leading to a special, dead-end switch fitted in a panel secured to one end of the cylinder. The aerial reaction is operated from the front of the panel by means of a fine bevelled gearing which gives a beautifully smooth action, allowing adjustment to the finest degree. A large black ebonite dial suitably engraved with two scales, one indicating the tapping points and the other degrees of reaction, is supplied, and can be used as a drilling gauge for fixing the unit to the panel. Four terminals are fitted at the bottom of the unit for the aerial and earth circuit and reaction coil.



R.I. Inductance.

One of the advantages gained by using this unit is that correct reaction is ensured over the range of wavelengths.

Safety Valve-holder

MANUFACTURERS have been so busy concentrating on special types of anti-capacity valve holders recently that there is a scarcity of good-quality general-purpose holders.

The Edison Swan Electric Co., Ltd., of Ponders End, Middlesex, manufacture a valve holder, moulded of genuine ebonite, and fitted with recessed pins to prevent the user shorting the filament of the valve across the H.T. supply.

Ball-bearing Condenser

It has often been stated that American manufacturers are ahead of us in producing high-class variable condensers. The condenser manufactured by R. McKellen and Co., of 58, High Street, W.C.1, is a soundly-constructed job.

The shaft carrying the moving plates runs on ball-bearings, as does the inner shaft carrying the vernier vane. A tension screw is fitted to enable the freedom of movement to be adjusted.



McKellen Condenser.

The condenser is of the square-law low-loss type, and simple one-hole fixing is employed.

Wireless Spanners

MOST of us have at one time or another, I suppose, found need for a small spanner capable of adapting itself to fit about a half-dozen different sizes of nuts, suitable for tightening the components on the panel.

Just such a spanner is manufactured by Messrs. Fastnut, of 17, Newnham Road, Wood Green, N.22.

The Fastnut spanner is of a very convenient size for manipulation between components on a panel, and yet will fit six different sizes of nuts. The little tool is a solid steel stamping, and is not liable to be easily damaged by rough usage.

The experimenter and the home constructor will find this miniature spanner a great saver of time and trouble, especially where the components are crowded together.

The Ediswan Transformer

I HAVE lately been using an Ediswan-type WL522 L.F. transformer in a two-valve set (detector and L.F.). The results obtained were excellent, music and speech being entirely devoid of that distortion so frequently met with in inferior types of inter-valve transformers.

The windings of this transformer are of high-conductivity silk-covered wire for the primary and high-conductivity enamelled wire for the secondary. The turns ratio between primary and secondary windings is 1 to 3.5 respectively. A guarantee that the insulation between the windings will

stand 1,000 volts is given by the manufacturers.

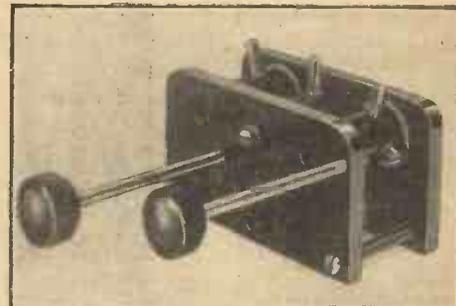
Stalloy laminations clamped firmly together form the closed iron core. A novel idea is the mounting of a fixed condenser of .001 microfarad capacity across the primary winding. In this manner the trouble of mounting a separate fixed condenser on the panel is avoided.

Yesly Coil Holder

A NEAT and well-finished coil holder is manufactured by the Engineering Supplies, Ltd., of 235A, Blackfriars Road, S.E.1.

The general appearance of this three-coil cam-vernier holder is very pleasing. It will take the heaviest coils without allowing the holders to fall out of position. The sockets are correctly spaced, allowing coils to be inserted without undue pressure, and convenient means are arranged making connections to both fixed and moving sockets.

In the three-coil holder the two control arms are of different lengths so that adjustment of one knob may be made without interfering with the other. The holder is



Yesly Coil-holder.

fixed to the panel by means of four small screws, and an accurate drilling template is provided.

C and S Valves

MESSRS. CRAIK AND SMITH, of Allen Street, Goswell Road, London, E.C.1, are to be congratulated on the production of two low-priced highly efficient dull-emitter valves. The two types (227 and 227L) have the following characteristics: Type 227—filament voltage, 2; current, 0.2 ampere; type 227L—filament voltage, 3; current, .06 ampere.

I have been using the former type, 227, with great success. The valve is an extremely efficient detector. This is borne out by the fact that New Zealand has been received in this country using one of these valves—a highly creditable performance. The valve gives a wonderful amplification completely free from distortion.

VANGUARD.

GECOPHONE

(Registered Trade Mark)

Britain's Best Broadcasting Sets.

PRICES FURTHER REDUCED

Consequent upon the reduction in the prices of



the following reductions

in the prices of GECOPHONE Receiving Sets
will operate as and from May 6th, 1925.

CAT. No.	DESCRIPTION.	PRESENT LIST PRICE			REDUCED PRICE.		
		£	s.	d.	£	s.	d.
BC. 1002	Crystal Set	2	10	0	2	10	0
BC. 1001	Ditto but with Headphones and Aerial Equipment ...	4	5	0	4	5	0
BC. 3000	Single Valve Set (DER Valve)	6	15	0	6	11	0
BC. 3001	Ditto but with Headphones, LT and HT Batteries, &c.	9	12	0	9	8	0
BC. 3050	Single Valve Set (DE3 Valve)	7	8	0	7	3	6
BC. 3051	Ditto but with Headphones, LT and HT Batteries, &c.	9	15	0	9	10	6
BC. 3250	2-Valve Set (Flat Model), Det and LF (DER Valves) ...	9	6	0	8	18	0
BC. 3251	Ditto with Headphones, LT and HT Batteries...	12	9	0	12	1	0
BC. 3255	2-Valve Set (Flat Model), Det and LF (DE3 Valves) ...	10	13	0	10	4	0
BC. 3200	2-Valve Cabinet Set, Det and LF, DER Valves complete with Headphones, LT and HT Batteries	17	19	0	17	11	0
BC. 3205	Ditto but with DE3 Valves	18	7	0	17	18	0
BC. 2001	2-Valve Cabinet Set, HF and Det (R5 Valves), complete with Headphones and LT and HT Batteries	19	12	0	19	6	0
BC. 2002	Ditto but with DER Valves	18	15	0	18	7	0
BC. 3256	2-Valve Set (Flat Model), Det and LF (DE3 Valves), complete with Headphones, LT and HT Batteries	12	17	0	12	8	0
BC. 3350	3-Valve Set, Det and 2LF (R5 and DE5 Valves)	17	15	0	17	1	6
BC. 3351	Ditto but with Headphones, LT and HT Batteries ...	23	2	0	22	8	6
BC. 3355	3-Valve Set Det and 2LF (DER and DE6 Valves)	18	1	0	17	9	0
BC. 3356	Ditto but with Headphones, LT and HT Batteries ...	22	11	0	21	19	0
BC. 3300	3-Valve Cabinet Set, Det and 2LF (R5 and DE5 Valves), complete with Headphones, LT and HT Batteries	27	7	0	26	13	6
BC. 3305	Ditto but with DER and DE6 Valves	26	16	0	26	4	0
BC. 2010	4-Valve Cabinet Set de Luxe	119	0	0	117	14	0
BC. 3400	4-Valve Combination Set (BC 2001 and BC 2580)	32	17	0	32	0	6
BC. 2050	5-Valve Cabinet Set	36	12	0	35	3	6
BC. 2585	Single Stage Amplifier	5	6	0	5	3	0
BC. 2580	2-Stage Amplifier	11	4	0	10	13	6

NOTE.—THE ABOVE PRICES INCLUDE ALL ROYALTIES.

Sold by all

GECOPHONE Service Depots, Wireless Dealers, Stores, Etc.

Advt. of The General Electric Co., Ltd. (Manufacturers and Wholesale only), Magnet House, Kingsway, London, W.C.2.

UNPOSTED LETTERS TO BOSPHOR PRONZ

DEAR BOSPHOR PRONZ,—After struggling for six nights in a vain attempt to pick up America, I cannot refrain from expressing my opinion that every mother's son who uses reaction ought to be imprisoned in a home for lost atmospherics. It's too bad, you know, B. P., and what are you going to do about it?

There was I, trying my best to hear WBZ, and a trying time I had, sure. All I could audiate were the howls of hundreds of SBF's using reaction. Whoop. Whoop. Whoo-oo-oo-ooooop!

Why are the Transatlantic tests always a failure? Because when they are on every whooper in the country howls like a darned cat at the dead end of its ninth life.

Judging by the way things sounded last night, the whoopers must have had 100 volts on the plate, and more. Plate gluttons, all of them. I opine that a plate glutton in front of a wireless set is worse than a plate glutton in front of a quick-service restaurant counter.

Not that every fan who uses reaction is a whooper, you know. I have a single-circuit close-coupled reaction set and, like the boy with his first razor, I go carefully, especially round the awkward corners, you bet yer life.

Seems to me a good plan would be to put all these whoopers in a wireless menagerie and allow them to scratch for themselves. Give them a week with nothing more to swing on than their own tickler coils. I'd be sure tickled to death to spend a pleasant hour in front of that whooper



Every mother's son who uses reaction.

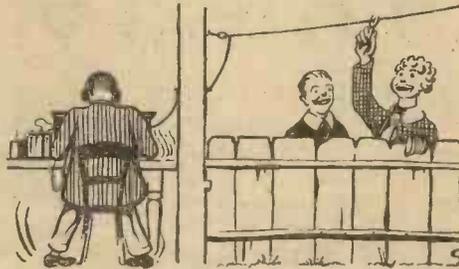
cage feeding the whoopers with 2 B.A. nuts.

Say, Bosphor, if I were elected keeper of that whooper menagerie there'd be a regular rough-house on Transatlantic nights.—Your admiringly,

HIRAM P. FORD.

DEAR BOSSIE,—I am writing to ask if you noticed how particularly interesting reception conditions have been during the past week. I am sure that you will not have missed observing the gradual changes which took place as the week wended along its predestined course from Monday to Saturday.

On Monday conditions were extraordinarily favourable for reception of wireless telephony. I do not remember better conditions since I took up wireless early in the present month. On both Monday and Tuesday there was a perfect babel or babble of stations on the broadcast band. I do not mean to imply that a band was being simultaneously broadcast. You are to understand, of course, that I refer rather



On Friday I could not even hear the local station.

to the broadcast band of wireless wavelengths.

Really, my dear Bosphor, the morse on the broadcast band was terrible. As the evening wore on, especially on the Tuesday, it got morser and morser, until, by the time the time pips came through it reached its very morst.

On Tuesday conditions were splendid. I even picked up Aberdeen, which, as you know, is a good six hundred miles from Paris and a good deal farther from Jerusalem. I think I have now given you sufficient evidence to show you how good conditions were at the beginning of the week.

On Wednesday, however, reception conditions were nothing like so good. The deterioration continued as the week advanced. On Thursday I could only hear the local station. On Friday I could not even hear the local station. Being somewhat of an expert on local reception conditions, I decided to take my accumulator to the charging station on the Saturday morning. When I got the accumulator there early on the Saturday I found, as I had half expected, that the cells were in a somewhat run down or discharged condition.

I am sure you will find the above account of the gradual change in our local reception conditions most interesting, and if you should happen to have a spare voltmeter, my dear Bosphor, I should be most happy to accept the same on loan for an indefinite period, and to make myself responsible for the return postage. The loan of a voltmeter would undoubtedly go a long way towards making local reception conditions here much more stable, and I thank you in anticipation.—Your always,

JOCK WALKER.

DEAR MR. PRONZ,—Do you really think that the B.B.C. folk work the noises of nature idea as much as they might? Personally I do not think so. We have had the nightingale in actuenso. We have the screech of the wild bird on the Norfolk fens, and the roar of Niagara in promisuendo, but such things leave me cold.

What disappoints me, Mr. Pronz, is that the broadcasting authorities persist in going after the things of nature which are striking in the sense of abnormality. In my humble opinion, they should go after the more normal striking things in this interesting world. For example, I consider the noise of a blacksmith's hammer on the anvil far more striking in the ordinary way than the noise of the nightingale.

How can the screech of a wild fowl on the Norfolk broads interest the masses to the extent of the screech of the referee's whistle after a wild foul in the cup final at Wembley? Is there any comparison between the chatter of a sea duck on a rocky coast and the chatter which follows a leading batsman's duck at Lord's?

You see my point, sir, let the B.B.C. give us the noises of nature which interest the masses and not the classes. Let them broadcast to us the purr of satisfaction of a policeman catching his first cat burglar from scratch. Let them transmit to us the varied noises of the shovepenny final of all the counties, the jingle of the stymied coin, the splash of an excited spectator's beer as it bites the sawdust.



Catching his first cat burglar.

Let them give us such natural noises as the wild remonstrations of a cricket professional whose valet has mistaken the bat oil for the brilliantine.

It has always seemed to me as if the intervals between turns on the programme are just the occasions for the broadcasting of some of nature's familiar noises. Why not use an interval once a week for the broadcasting of the noises made by a cat before, at and after the hunting of a gaping goldfish in a glistening bowl? A dog fight ended by a well-aimed bucket of water would also make an acceptable turn.—Yours inductively,

CUTHBERT.

FURTHER BIG REDUCTION

in the prices of

COSMOS

RADIO VALVES

THE enormous demand for "Cosmos" Valves resulting from the recent reduction in prices for the summer season (as announced in this journal last week) leads us to anticipate still larger demands in the future, and in consequence we have determined to pursue the policy still further and to give the public without delay the benefit of

A FURTHER REDUCTION IN PRICES

Obtain them from your dealer at the prices shown below

METRO-VICK SUPPLIES LTD.

(Proprietors: Metropolitan-Vickers Elec. Co., Ltd.)

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The "Cosmos" DULL EMITTER "DRY CELL" VALVE, Type D.E.11 is now well known as a highly efficient valve suitable for H.F. or L.F. Amplification and for Loud Speaker work.

Filament 1.1 Volts.
 " 0.25 Amps.
 Anode 20 to 100 Volts.

PRICE:
 Reduced from 21/- to

12/6

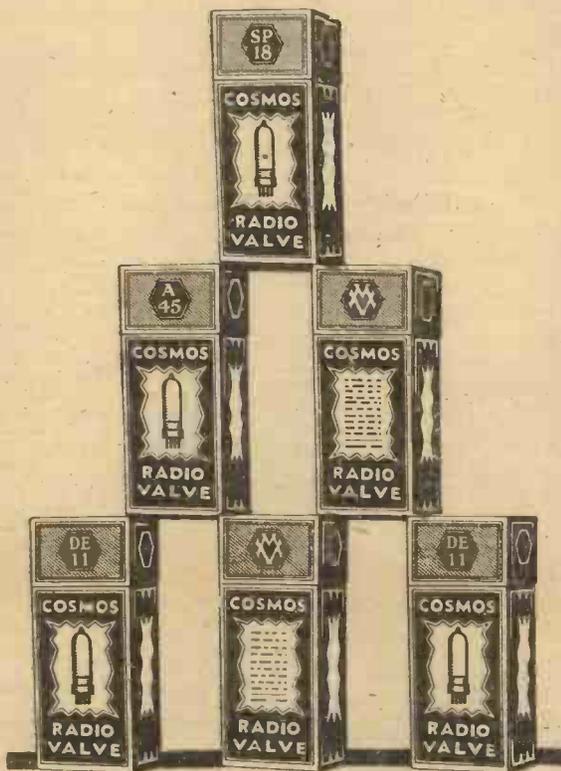


The "Cosmos" BRIGHT FILAMENT VALVE, Type A.45 is remarkably efficient for Detection, H.F. and for L.F. Amplification.

Filament 4.5 Volts.
 " 0.65 Amps.
 Anode 30 to 120 Volts.

PRICE:
 Reduced from 11/- to

7/6



"COSMOS" S.P.18 DULL EMITTER IS ALSO REDUCED FROM 18/- TO 12/6.



RADIOGRAMS

SUBJECT to the approval of the Admiralty, it is proposed to broadcast on June 3 incidents of naval life and routine from H.M.S. *President*, the headquarters ship of the London Division of the Royal Naval Volunteer Reserve. The chimes of Big Ben will be eclipsed for the occasion by the striking of "eight bells" in the ship at Blackfriars.

The first part of the programme for May 21 consists of military band music given by the band of H.M. Coldstream Guards under Lieut. R. G. Evans. Interludes will be provided by Miss Rita Sharpe (cellist) and by Willie Rouse in bright and musical humour. At 10.20 p.m. Act III of Wagner's opera, *The Valkyrie*, the second of the famous tetralogy, *The Ring*, will be relayed from the Royal Opera House, Covent Garden. Afterwards, at 11.15 p.m., the Savoy Bands will be heard till midnight.

Following the installation of a transmitter at Oslo, the Norwegian authorities have now opened a broadcasting station at Aalesund. The wavelength chosen is 515 metres (that of Zurich), but in view of interference it is likely that a change will shortly be made.

The first hour's programme, on May 22, at 8 p.m., consists of solos and duets by members of the orchestra. During the programme Mr. Ralph de Rohan and Miss Telma Waldron will present a short sketch entitled *Kissing*. At 8.45 p.m. "Quips" will conclude his present series of anecdotes with reminiscences of rustic humour collected by him under the title of "The Parish Pump." An hour's ballad programme at 9 p.m. will be given by Miss Carrie Tubb (the popular soprano), Mr. Leonard Gowings (tenor), and Mr. Hamilton Harris.

The attempt to broadcast the Prince of Wales's first African speech throughout the Union by wireless was not an unqualified success owing to land-line induction.

A speech made by the King will be broadcast on May 19, when he will open the new electrical power station at Barking.

At 8 p.m. on May 23 an hour's informal recital will be given by Miss Kate Winter (soprano), Mr. Norman Notley (baritone), Miss Daisy Kennedy (violinist) and Miss Irene Scharrer (pianist). At 9 p.m. the cheery "Roosters" will give, in collaboration with Mr. Dan Godfrey and the Wireless Orchestra, "An Hour of Mirth and

Minstrelsy," which will include a burlesque entitled *Alice*, written by Mr. Percy Merriman.

Radio Toulouse, a new broadcasting station situated on a small hill about 2 kilometres distance from the city of Toulouse, made its first tests on April 17. Since that date it has been giving a daily programme of news and music at 16.45 B.S.T. The station is at present working on 450 metres with a power of about 2 kilowatts, but the wavelength will be shortly reduced to about 300 metres, as at present it lies in a very congested portion of the broadcasting band.

The Empire Day thanksgiving service will be relayed from the Stadium, Wembley, between approximately 2.30 p.m. and 4 p.m. on May 24, taking the place of the customary afternoon concert. De Groot and the Piccadilly Orchestra will be heard in the evening, the vocalist being Mr. Ashmoor Burch (baritone).

Berlin has decided that Chelmsford shall not be the only high-power broadcasting station to be heard in Western Europe. The new 20-kilowatt transmitter installed at Koenigswusterhausen, working on a wavelength of 1,300 metres, will begin testing this month. The station will be utilised for the broadcasting of news bulletins and special musical transmissions for the whole of Germany.

The 2 LO programme S.B. to all stations except Chelmsford on May 25 is a light Russian symphony programme conducted by Eugene Goossens. The pianist in the programme is Miss Marcelle Meyer. The pianoforte concerto in C sharp minor by Rimsky-Korsakov is a short work which has never before been broadcast.

The Marconi International Marine Communication Co., Ltd., celebrated the twenty-fifth anniversary of its incorporation on April 25. The company's influence has been world-wide, and to-day there are few ships of importance that are not fitted with wireless apparatus.

At 8 p.m. on May 30 another of the "hours of new features by old friends" will be given, this being *An Hour in a Restaurant*. John Henry and Blossom will entertain "Our Lizzie" and "Stainless Stephen," and much attendant humour may be expected. "An Hour of Old Favourites," both orchestral and vocal, will be broadcast, the singers being Miss Nellie Walker (contralto), Mr. Frederic Lake (tenor) and Mr. Glyn Eastman

(bass). Listeners will welcome such old songs as "Three Fishers Went Sailing," "Nancy Lee," "The Old Brigade," "Thora" and "The Holy City," which will come up very fresh again. Dance bands will be heard from 10.30 p.m. till midnight.

It is announced in an Admiralty notice to mariners that the service of wireless weather reports which would serve the needs of coastwise shipping will commence on June 1, and that from that date the appropriate parts of the bulletins now issued through the Air Ministry will be repeated through four other stations. The stations selected for this purpose are Valentia, Seaforth, Niton and Cullercoats.

The programme from 5 XX on May 26 is in the nature of a ballad programme, the vocalists being Miss Carmen Hill (mezzo soprano), Miss Mary Foster (contralto) and Mr. Stephen Williams (baritone). A group of pianoforte solos will be given by Miss Marcelle Meyer, who is playing a concerto the same evening. Syncopated songs, with piano and banjo accompaniment will be provided by Messrs. Kel and Alvin Keech, and humorous entertainment by Miss Lois Barker and her partner, Mr. Percy Tarling.

The Phillips (Eindhoven) valve works have concluded arrangements with the French authorities by which special concerts organised and provided by this firm will be broadcast from the Eiffel Tower. The wavelength of 2,650 metres will be retained for the purpose.

A light programme for May 28 will be given by Squire's Celeste Octet, the artists being Miss Helena Taylor (mezzo soprano), Mr. Leonard Salisbury (bass) and John Henry. The programme will be in two sections, the first consisting of old-time favourites, such as arrangements of songs of thirty years ago, and the other quite up to date.

A new record has been made by Mr. E. T. Simmonds, who succeeded in establishing two-way communication with an Australian amateur on May 2 and 3. The station was 2 CM, and it is interesting to note that on May 2 communication was established at 5.52 a.m.

At Glasgow the B.B.C. are arranging summer wireless trips to beauty spots of Scotland. One of the chief purposes of this novelty is to allow those who are kept in town by business to enjoy audibly, if in no other way, the delights of holiday-making. The first of these programmes is described as a motor tour in the Trossachs.

A new type of wireless set, weighing 50 lb., with a range of 15,000 miles, is in use at the Marine Flying Field, Quantico, Va. This set transmits on a wavelength of 90 metres. Messages from this equipment were recently received on the Island of Guam, in the Western Pacific, 10,000 miles away.

K. RAYMOND

NOTE 2 ADDRESSES

These GOODS SENT POST FREE U.K. except where stated. Foreign orders extra for post and packing.

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THESE TWO COLUMNS for CALLERS ONLY Post Orders OTHER COLUMNS

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Aerial, 7/22, 100 ft.	2/6
50 ft. ditto	1/8
Basket Holder and Plug	2/2
Ditto, best quality	2/3
Ditto, spike holder	2/2
2-way coil stands	2/9
3-way coil stands	4/6
2-way nickel	3/6
3-way nickel	3/6
2-way geared	5/6
2-way Shipton cam	6/-
3-way Shipton cam	7/6
2-way Polar cam	6/-
3-way Polar cam vernier	9/-
2-way cam vernier	3/6
Coil plugs, plain	2 for 1/3
Shaped wedge, 2 for Do. Edison Bell	1/6
Do. Nickel sides	2 for 2/-
Do. fitted fibre, 2 for	1/8
Variometer	2/6
Ebonite do.	4/11
Edison Bell do.	10/-
Fixed Condensers:	
Edison Bell, 0011	1/3
.001 up to .0005	1/3
.002 up to .006	2/-
Grid leak & clips	1/6
.0003 & grid leak	2/6
Dubilier:	
.001 to .0005, each	2/6
.001 to .006, each	3/6
2 or 3 meg. Grid Leak	2/6
Anode res. on stand	5/6
(50, 70, 80, 100,000 ohms.)	
Raymond Ebonite Base	1/1
.001 up to .0005	1/3
.001 up to .006	1/3
Grid leak & clips	1/3
.01 and .02 ... each	1/9
Mansbridge T.C.C.:	
2 mid.	4/6
1 mid.	3/10
.25	3/8
Flush panel sockets, with nuts, doz.	1/3
Spade terminals, doz.	1/-
Pin terminals, doz.	1/-
Spade tags, doz.	6d.
Studs, nuts, and washers	doz. 9d.
Shorting plug	3d.
Bus Bar, 1/16th sq. 12 ft.	1/-
Solid Rod Valve Holders	1/3
Murray Valve Holders	1/3
Bretwood do.	1/9
H.T.C. under panel	1/6
H.T.C. over panel	1/9
Barrie anti-cap	1/3
Burdette Detector	4/-
Dual Rheostat	7/6
Ormond Rheostat	2/-
Ormond L.F.	14/6
Rheostat C. & S.	1/3
Do. Raymond	1/6
R.I. Detector	6/-
Empire Tape 3 in. 12 yds.	1/9
Red & Black, 12 yds.	2/-
72-in. Phone Cords	1/11
Local Speaker Cords	1/11
East Fix	3/-
Set of Drills (7)	1/9
Screwdrivers	8d.
Set of 5 Spanners	8d.
Soldering Iron	1/1
Tin Soldo	1/6
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D.P.D.T.	1/3
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LISSEN Minor	
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Lissen L.F. T. 1	30/-
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LISSEN 60	6/4
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50, 5/-, 60, 5/4	
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ENERGO H.F.	
No. 1 150/450	3/6
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C.A.V. Tom-Tit	30/-
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Amplion Junior	27/6
Amplion Dragonfly	25/-
Amplion Do. III	50/-
Amplion De Luxe	65/-
Amplion AR19	105/5
Dulcevox	42/-
True Music Minor	21/-
TRANSFORMERS L.F.	
Eureka Concert	30/-
Grand	30/-
Eureka Second Stage	22/6
Igranic Shrouded	21/-
New Model	21/-
Formo Shrouded	18/-
Formo Open Type	12/6
Portland	12/6
General Radio 83	15/-
Super Success (black)	21/-
Royal	20/-
TERMINALS COMPLETE.	
Pillar doz.	1/3
No. EH 333 on earpiece	1/-
These 'phones are lighter than a feather. 17/11 pair.	
ERICSSON E.V. CONTINENTAL	
12/11	
Your favourite 'phones. Entirely NEW MODEL. Most beautifully finished exquisite tone (4,000 ohms).	
VALVES	
8/- B.T.H. etc. We highly recommend Mullard valves	
COSMOS	
Met-Vickers Ltd.	
Bright emitter valve	7/6
SHIPTON STRIP.	
7 ohm Rheostat	3/-
30 or 60 ohm	3/-
Potentiometer, 600 ohms	4/6
WONDER AERIAL	
Phosphor Bronze, 49 strands. Not cheap imitation. 110 ft. ... 3/3	
Polar capacity coupling unit	15/-
SUNDRIES	
Grid Leak & 0003	2/2
Edison Bell do.	2/6
Dubilier do.	5/-
'UTILITY' SWITCHES	
2 Pole c/o Knob	4/-
2 Pole c/o Lever	5/-
4 Pole c/o Knob	6/-
4 Pole c/o Lever	7/6

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One-hole fixing Aluminium ends. With Vernier

.001	8/6	Ebonite Bushes Highly recommended Without Vernier	.001	7/7
.0005	7/6		.0003	5/3
.0003	7/-		.0005	5/9

Complete with Knob and Dial. Ebonite ENDS 1/- EXTRA POST FREE.

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.00025	6/6
.0003	7/6
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.001	9/-

With Vernier 1/6 extra. Knob and Dial Free.

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Square Law with Vernier	.001	10/6
Ebonite	.0005	9/6
Ends, Knob and Dial	.0003	9/-

LONDON'S LARGEST Stockist of JACKSON BROS.

J. B. Variable CONDENSERS

Complete with Knob and Dial.

SQUARE LAW	STANDARD		
.001	9/6	.001	8/6
.0005	8/-	.0005	7/-
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.00025	6/9	.0002	5/-

Square Law with Vernier. All ebonite ends. .0005 ... 12/6 | .0003 ... 11/6

Super Heterodyne Parts Stocked.

MAGNUM

(Burne Jones, Ltd.) All parts stocked.

Magnum tapped coil No. 1. ... 12/6
150-1,050 metres

Magnum tapped coil No. 2. ... 15/-
450-3,650 metres

H.F. TRANSFORMERS.

Protected windings.

150-300; 250-525; 300-600; 550-1,200; 1,200-3,000; all each, 7/-.

COIL HOLDERS.

2-way ... 9/6; 3-way ... 12/6
Neurodyne Condenser ... 4/6

Send for lists.

IMPORTANT!

By agreement with Messrs. Bower Electric

GENUINE 5-PIN Thorpe K4, 17/6

(Unidyne valve)

5-pin holder ... 1/3

Set of parts for 1-valve Unidyne, 50/-

For 2-valve set, 75/- excluding box and ebonite.

Complete set, made up, tested and guaranteed (2 valves)

£9 9 0

H.T. BATTERIES	
(Various makers)	
60-v.	5/6, 6/6, 6/11
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EVER-READY	
66-v.	13/6
108-v.	22/6
60-v. B.B.C.	8/6
36-v.	5/6
16.5	2/9
9-v. (grid bias)	2/3
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Stock sizes 3/16th	
6 X 6 - 7 X 3 each	1/2
8 X 6 - 9 X 6 each	1/10
10 X 8 - 12 X 6	2/-
12 X 9	4/6
12 X 12	5/3
14 X 10	5/6
1/4th in. also stocked.	
D.C.C. WIRE 1 lb.	
18 or 20 g.	9d.
22 g.	10d.
24 g.	11d.
26 g.	12d.
28 g.	1/2
16 g. per lb.	2/4
SWITCH ARM	
12 studs, 12 nuts, 12 washers. The lot: Brass 10/6; Nickel 1/8.	
2-way coil stand	1/7
2-way ditto	1/11
2-way cam vernier	3/3
2-way geared	5/3
Extra air space. Set of 5 coils, 23, 35, 50, 75, 100 1/8	
Ebonite basket holders, 6d.	
7d., 8d., 9d., 10d., 1/1	
Flush windows	4d.
Screws and nuts	2 a 1d.
Phone connectors	1d.
Filters, good make, 10d.	
Chimax earth tubes	5/6
Twin silk flex, 5 yards	6d.
RHEOSTAT	
Ormond	1/6
Raymond	1/3, 1/6
With dial	1/3, 1/11
SQUARE LAW VARIABLE CONDENSERS	
.0005	5/6
.0003	4/6
with knobs and dial	
PANEL	
D.P.D.T.	1/-
S.P.D.T.	10d.
China base	10d.
D.P.D.T.	1/3
S.P.D.T.	8d.
5/- 'PHONES	
Customers buying 20/- worth full-price goods can have a first-class pair of 'phones for 5/-. Must be taken at time of purchase.	
FIXED CONDENSERS	
Raymond (ebonite base) .001, .0001, 2, 3, 4, 5, 10d.	
.002, 3, 4, 5, 10	1/-
Terminal fittings.	
TRANSFORMER	
Special line	
L.E. 5-1	7/6
ELECTRICIANS'	
insulated pliers. Good quality. Pair ... 10/6	
MANSBRIDGE	
2 mfd., 3/9; 1 mfd., 3/3	
25	2/9
BREAST DRILLS	
Double pinions. Cut bevel, 4/3	
West end Stockist of Edison Bell, Igranic, Goswell (quality) Polar, Jackson Bros. (4.3.5.), M. reed, (Cosmo), Mullard, Edlewan Valves, Sterling, B.T.H., McMichael's, Lissen, Dubilier, T.C.C., Shipton parts.	
DOUBLE COIL FORMERS	
Double ... 1/-	
ACCUMULATORS	
(well-known makes)	
2v. 40a	7/6, 8/6
4v. 40a	13/11, 15/11
4v. 60a	17/6, 18/3
4v. 80a	22/6, 23/6
6v. 60a	25/11, 27/6
6v. 80a	33/-
6v. 100a	38/6
Terminals, 1d., doz. 10d.	
Nickel	11d.
Valve sockets, 4 for 3d.	
Stop or valve pins	1d.
Washers	13 a 1d.
Nuts	6 a 1d.
Spade Tags	6 a 1d.
Spade terminals, 3 for 1d.	
Pin terminals, 2 for 1d.	
Above red and black, 2 for 3d.	
Copper foil, foot	21d.
Bell wire, 10 yds.	5d.
Red and black flex, 12 yds.	1/6
Aerial, 7/22 100 ft.	1/10
Battery clips	3 a 1d.
Sleeving, 12 yds	6d.
Wander plugs	pr. 2d.
Contact studs complete 2 a 1d.	
'Phone cords, 6 ft.	1/3
Knobs	10.
Knobs and Dials	10d.
Empire Tape	12 yds. 6d.
Valve Holders	8d.
'Phone Plug and Jack	4d.
7/22 Aerial, 50 ft.	1/1
Ins. Hooks	2 for 1d.
Loud speaker cords, 1/4, 1/6	
Ins. Staples	5 a 1d.
Flush panel sockets (nickel)	1d.
Flux and nuts	10.
Rheostats special	9d.
Vernier condensers	1/9
CRITERION COILS	
25, 35, 50, 75, 100, Set of 8, 11	
Sold separately.	
ERICSSON E.V.	
Continental 4,000 ohm 'phones worth much more. Callers 11/9	
Tumbler switches ... 10d.	
Shorting plug ... 3d	
Egg insulators ... 4 for 3d.	
Variometer 250/650 ... 1/6	
Murray valve holder ... 1/3	
Anticap ditto ... 10d.	
Solid rod standard ... 1/-	
Good quality do. ... 8d.	
H.T.C., Bretwood, etc.	
Hank 1/16th sq. Bus Bar 6d.	
Lead-in (10 yds.) ... 1/-	
Ebonite dials ... 8d.	
Unbreakable knobs ... 2d.	
Adhesive tape, roll ... 2d.	
Valve templates ... 11d.	
Tape aerial, 100 ft. ... 1/10	
Set of 5 spanners ... 3/0.	
Screwdrivers ... 2d.	
Soldering irons ... 6d.	
Drills (7) ... 1/2	
Soldier (2 sticks) ... 21d	
EBONITE COIL FLUGS	
Fitted Fluor ... 7d.	
Plain ... 4d.	
Shaped ... 6d. and 7d.	
Edison Bell ... 11d.	
Loud speakers ... 15/9	
4,000 ohm 'phones ... 6/6	
3-way coil stands ... 3/6	
Special rheostats ... 1/-	
Crystals, best ... 6d	
Enclosed detectors ... 8d.	
Extra large do. ... 1/-	
2v. 40 accumulator ... 7/6	
MICROMETER	
Crystal detector, enclosed 1/6	
DR. NESPER	
(genuine) 4,000 ohm 'phones Callers ... 11/9	
REACTOR COILS	
Set of 5 ... 3/-	
1 for 5 X X ... 1/9	

7, GRAPE ST.,
Shaftesbury Avenue, W.C.2.
NOTE! GRAPE ST. is between Princes (POST ORDERS Theatre and New Oxford Street. TO ABOVE)
Open 9 to 8. Closed on Sundays.

27, LISLE ST.,
Leicester Square, W.C.2. Open
(Eack of Daly's Theatre)
9 to 8.
Be sure IT'S RAYMONDS. Sundays 11 to 1

CHEAPER VALVES!

A WELCOME reduction in the price of valves took place on Wednesday, May 6. As a guide to the purchaser, we give below lists of the old and of the reduced prices instituted by the chief manufacturers. It is expected that reductions in the prices of other valves will take place in the near future.

MARCONI-OSRAM VALVES.

Type	Old Price	New Price
DER	18/0	14/0
DE6	22/6	18/6
R	11/0	8/0
DE3	21/0	16/6
DE3b	21/0	16/6
DE4	26/0	22/6
R5V	11/0	8/0
DE5	30/0	22/6
DE5b	30/0	22/6
LS5	50/0	40/0
V24	25/0	20/0
QX	27/6	20/0
DEV	30/0	25/0
DEQ	35/0	27/6
LS2	35/0	22/6

EDISWAN VALVES.

AR	11/0	8/0
R	11/0	8/0
ARDE	18/0	14/0
AR06	21/0	16/6
PV1	35/0	22/6
PV2	35/0	22/6
PV3	22/6	22/6
PV5DE	30/0	22/6
PV6DE	22/6	18/6
PV8DE	30/0	22/6

MULLARD VALVES.

ORA (A)	11/0	8/0
ORA (B)	11/6	8/6
H.F.	11/0	8/0
L.F.	11/0	8/0
H.F. D.06	21/0	16/6
H.F. D.3	18/0	14/0
L.F. D.06	21/0	16/6
L.F. D.3	18/0	14/0
Det. D.06	21/0	16/6
Det. D.3	18/0	14/0
DFA0	26/0	22/6
DFA1	30/0	22/6
DFA3	32/0	24/6
DFA4	30/0	22/6
Weco A.	21/0	16/6
Weco B.	21/0	16/6

COSSOR VALVES.

P1	11/0	8/0
P2	11/0	8/0
W1	18/0	14/0
W2	18/0	14/0
WR1	20/0	16/0
WR2	20/0	16/0
W3	22/6	18/6

B.T.H. VALVES.

Type	Old Price	New Price
R	11/0	8/0
B3	18/0	14/0
B5	21/0	16/6
B4	30/0	22/6
B6	30/0	22/6
B7	32/0	24/6

COSMOS VALVES.

DE11	17/6	12/6
A45	9/6	7/6
SP18	15/0	12/6

WESTERN ELECTRIC CO., LTD.

Wecoalve	21/0	16/6
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ECONOMIC ELECTRIC CO., LTD.

Extraudion	11/0	8/0
Dextraudion	18/0	16/6

ELECTRON CO.

"Six-sixty"	14/0	8/0
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"A BRILLIANT PRODUCTION"

The opinion of a critic of
"THE WIRELESS MAGAZINE"

HERE ARE SOME OF THE CHIEF
CONTENTS OF THE MAY ISSUE

A Loud-Speaker Three-valver For The
Family

Crystal Set Construction In Successive
Stages

Building A Power Amplifier

The Long-distance Experimenter's
Crystal Set

The New Stations

BY CAPT. P. P. ECKERSLEY

Radio and the Rustic

BY F. W. THOMAS

Stories of Early Broadcasts

BY WILLIAM LE QUEUX

How to Receive America

BY F. L. HOGG

Obtain your copy Now 1/-

The proposed new wireless stations at Pretoria and Salisbury, Rhodesia, will not be used for broadcasting concerts. The intention is that the facilities provided shall be used for the interchange of commercial messages, thus supplementing the telegraph system.

The Marconi Company's "ship's orchestra repeater," designed to enable music played in a saloon to be heard in other parts of a ship, has been in operation on recent voyages of the Canadian Pacific liner *Montclare*, the White Star liner *Cedric*, and the R.M.S.P. liner *Arlanza*.

The "AMPLION" Loud-speaker illustrated in the advertisement of the House of Graham, which appeared in our issue of May 2, was inadvertently described as the "New" Junior-de-Luxe Model A.R. 114, priced at £3 5s., whereas, as many readers must have recognised, it was the well-known "Swan-Neck" Model A.R. 15, the price of which is £6.

WIRELESS IN PARLIAMENT



From Our Own Correspondent.

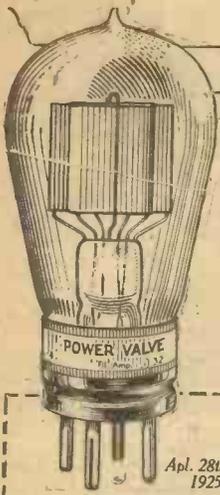
THE subject of imported valves was raised in the House of Commons on Tuesday, May 5, when Mr. Day asked the President of the Board of Trade whether he was aware that large quantities of foreign wireless valves were being imported into this country and that some of these valves were an infringement on patent rights held by British manufacturers; that recently several retailers in a small way of business had received writs, issued by the British Thomson-Houston Manufacturing Co., Ltd., who alleged infringement of their patent rights; and whether, in view of the hardship inflicted upon those small traders, he was prepared to cause importers of such goods into this country to make declaration to the effect that the said goods do not infringe patent rights held by British manufacturers?

Sir P. Cunliffe-Lister said he was aware that wireless valves were being imported into the United Kingdom, and he understood that during the last twelve months legal proceedings had been taken by the British Thomson-Houston Co. against six infringers, four of whom were importers; all these firms were wholesalers, but two did a retail business also. In each case the proceedings were successful. He had no power to require importers of wireless valves to make any such declaration as that suggested in the last part of the question.

AN APPEAL

THE Middlesex Hospital, famous all over the world for its research and cancer work, is in grave danger. Its 150-year-old buildings have been found unsafe, the floors full of dry-rot, the ceilings cracking, and the shallow foundations insecure. The serving of a "dangerous structure" notice by the London County Council has only been averted by the closing of two wards, the strutting of the basement and fourteen wards with heavy baulks of timber, and the undertaking by the hospital authorities that the whole of the old buildings will be demolished as soon as temporary accommodation for the patients can be found. The Middlesex is to be rebuilt, not from choice but from necessity. The alternative to rebuilding the condemned blocks is to allow them to go out of existence altogether. In some way or another the vast sum of £500,000 must be found if this disaster is to be averted, and contributions are urgently required.

A new hotel close to Niagara Falls broadcasts the roar of the falls every evening at seven o'clock.



APEX VALVES

Low Priced—yet Guaranteed

THERE'S a feeling of security in purchasing a guaranteed valve—the knowledge that should by mischance it not be perfect it will be instantly exchanged.

This and the fact that Apex Valves cost considerably less than any other valves of similar quality, make them an outstanding proposition for every amateur.

If your dealer cannot supply, write direct giving his name and supplies will be arranged.

APEX VALVES are made in three types—

- Dull Emitter L.F. Power Valve for 4 volt accumulators, Type P4.
- Dull Emitter L.F. Power Valve for 6 volt accumulators, Type P6. Price .. 18/6
- Dull Emitter General Purpose Valve Type '06 Price 14/6

Apl. 28th, 1925
23, Heigham Road, East Ham, E.6.

Sirs,
No doubt you will be pleased to hear that I get remarkable volume and results with your P6 type Valve. This valve is far in advance of any other that I have tried, and it is worth its weight in gold. As I am now making 'A.W.' Super-Set I will certainly try two of your P6 Valves, and should get splendid results.
Yours faithfully
(Sgd.) A. E. Page.

THE APEX VALVE CO.,

4, GREAT ST. THOMAS APOSTLE, LONDON, E.C.4
City Ag. n's: A. Munday, Ltd., 45, Eastcheap and 59, Watling Street, E.C.

Wireless is attracting all men. The Amateur is entering the field in great numbers, and he wants to know all about it. He will require Materials, Parts, Tools. He will also want to sell surplus material.

“AMATEUR WIRELESS”

is out to cater for this class of reader, who will be eager for knowledge and bargains. To meet him, use the Sale and Exchange columns, which he is sure to search. Rate 4d. per word, 4s. minimum, prepaid. Latest date Thursday mornings.

Address: The Advertisement Manager, "Amateur Wireless," La Belle Sauvage, Ludgate Hill, London, E.C.4

A WONDERFUL ACHIEVEMENT

Being manufactured of a special composition, the "Scientific" NON-METALLIC SPEAKER HORNS are absolutely non-resonant and distortionless, whilst giving full volume. Finish—an attractive dull bronze.



	Ht. in.	Flare in.	Price
SMALL SWAN-NECK	15	8 1/2	5/9
SWAN-NECK with petal flare	18	10	7/1
SMALL WESTERN pattern	19	11	7/9
MEDIUM	22	12	8/9
do. with petal flare as illustrated (SSS-482)	22	12	9/9
LARGE WESTERN pattern	24	15	11/9
CURVED HORN, designed for Amplon Juniors, as illustrated (SSS-466)	15	11/9	
LARGE SWAN-NECK, exceptionally loud	24	15	14/9
do with Petal Flare	24	15	15/9

Post, packing and crate, 1/9 extra.



SCIENTIFIC SUPPLY STORES

80, Newington Causeway, London, S.E.1.
126, Newington Causeway, S.E.1.
7, St. George's Circus, S.E.1.
16, Manette Street, Charing Cross Road, W.2.
207, Edgware Road, W.2.
84, Church Road, Upper Norwood, S.E.23.
Phone Hop. 4177.

Music-Masters both!



80%

THE "Revo" Loudspeaker is as near perfection in reproduction as a loudspeaker can be. We didn't put it on the market till we had explored every avenue of research, and now we have a loudspeaker that reproduces melody that's rich and pure, exquisite in its fidelity.

By the peculiar construction of the throat and bell, distortion is kept at zero point and "muffling" is entirely absent.

The diaphragm adjustment is most flexible in its control.

THE "REVO" SENIOR
Specification: 22 in. high; Aluminium Trumpet 14 in. diam.; Finished Crystalline Black.
Price, 80/-.

The "Revo" "Senior" Loudspeaker has two small brothers, the Junior and Baby, worthy followers, finished black, price 48/- and 25/- each respectively.

All guaranteed for 12 months.

At all dealers. If unable to obtain locally write direct:

THE CABLE ACCESSORIES CO., LTD.
Tivdale, Tipton, STAFFS.



We produced the "Revo" Lightweight Headphone to meet the demand for a light, comfortable and ultra-sensitive phone. No pressure, no hair-tearing, no discomfort, no projections. 19/6. Guaranteed for 12 months.

“Revo”

“The Name for Perfect Radio”



RI

"Perfection in Detection"

A Permanent Wireless Detector
Practically every technical and popular Wireless paper in the country has endorsed in the strongest of terms the remarkable advantages the **R.I. Permanent Mineral Detector** possesses over every other form of crystal detector. The demand for this detector has exceeded that of any other wireless component since broadcasting was introduced, and wireless experts are unanimous in their opinion that it is only a question of time before one is used in every crystal set. **"No Catwhisker is employed."** Rectification is obtained by a selected piece of rare mineral in combination with another mineral. A spring plunger is fitted to one of the elements and enables the point of contact to be moved if desired, although this is not necessary. You want a detector that is permanent, that remains permanent, that can be used—by a child as well as an adult—in any set, whether crystal, valve, or reflex, and at the same time is as good as any crystal combination. Write for new booklet: **"The Discovery of 1925."** The R.I. Detector is now obtainable from all reliable dealers or direct from the makers.

PRICE 6/-

Complete with metal brackets and screws for mounting.

**12 HYDE ST.
NEW OXFORD ST.
LONDON, W.C.1**

Contractors to the Admiralty and all Government Departments

RI LTD



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 British Summer Time.

London (2LO), 365 m. 1-2 p.m., con. (not daily); 4-5 p.m., con.; 6.0-6.35 p.m., children; 6.40 p.m., light music; 7-7.30 p.m., time sig., news, talk; 8.0-10 p.m., music; 10.0-10.30 p.m., time sig., news, talk; 10.30-11.0 p.m., music. Tues. and Thurs. the Savoy Bands are relayed until 11.0 p.m., and on Sat. until midnight.

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), 326 m. Plymouth (5PY), 335 m. Sheffield (6FL), 301 m. Stoke-on-Trent (6ST), 306 m. Swansea (5SX), 481 m.

Chelmsford (high-power station), 1,600 m. Experimental transmission every Monday at 11.00 p.m. from one or other main or relay station.

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. (B.S.T.).

AUSTRIA.

Vienna (Radio Wien), 530 m. (1.4 kw.) 09.00, markets (exc. Sun.); 11.00, con. (Tues., Thurs., Sat., Sun.); 13.05, time sig. weather; 15.30, Stock Ex. (exc. Sun.), news, con.; 17.10, children (Sat.), women (Wed.); 18.30, lec.; 19.00, lec. (Fri.); 19.30 news, weather, time sig., con., lec., news; 19.45, Engl. (Mon., Fri.); 22.00, dance (Wed., Sat.).
Graz, relay from Vienna, 404 m. (500 w.) Own con.: 17.00, 20.00.

BELGIUM.

Brussels, 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.).

CZECHO-SLOVAKIA.

Prague (Strasnice), 570 m. (1 kw.) 10.00, Stock Ex. (weekdays); 11.00, con. (Sun.); 11.30, Stock Ex. (weekdays); 17.00, Stock Ex., con. (Wed., Sat.); 18.00, Stock Ex. (weekdays); 19.15, con. or lec., weather, news, children (Sat.); 20.00, con., dance.

Brünn (OKB), 1,800 m. (1 kw.) 10.00, con. (Sun.); 14.00, Stock Ex., news; 19.00, lec. or con. or dance.

DENMARK.

Copenhagen (Kjobenhavns Radiofon station), 775 m. (1 kw.) 19.35, notices, lec., con.* (Tues., Thurs., Sat.); 21.30, Esperanto (Wed.). * This con. is also relayed by the Aalborghus ship station on 445 m. Sun.: Copenhagen only.

Lynby (OXE), 2,400 m. (2½ kw.) Weekdays: 19.20, news, Stock Ex.; 21.00 and 22.00, news, weather, time sig. Sundays: 16.00 and 21.00, news.

Ryvang, 1,190 m. (1 kw.) 20.00, con., news (almost daily).

FRANCE.

Eiffel Tower, 2,650 m. (6 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.); 18.15, con.; 20.10 and 22.10, weather; 20.00, con. (on 2,200 m.), Wed., Sun. (temp.).

Radio-Paris (CFR), 1,750 m. (about 5 kw.) Sundays: 12.45, con., news; 16.30, Stock Ex.; 20.15, news, Esperanto, con. or dance. Weekdays: 12.30, con., markets, weather, news; 16.30, markets; 20.15, news, con. or dance. **Radio Magazine con.**, 20.45, every 2nd and 4th Thurs. in month.

Le Matin, Paris, provides a special con. every 2nd and 4th Sat. in the month at 21.00. CFR frequently relays 5XX after 22.00.

L'Ecole Sup. des Postes et Télégraphes (PTT), Paris, 458 m. (800 w.) 14.00, lec. relayed from Sorbonne University (Thurs.); 15.00, outside relay (Sat., irr.); 15.45 and 17.00, lec. relayed from Sorbonne (Wed.); 16.00, outside relay (irr.); 20.00, Engl. talk (Tues.), children (Thurs.); 20.30, lec. or con., almost daily.

"Le Petit Parisien," 345 m. (500 w.) 21.30, con. (daily, exc. Wed., Fri.).

GERMANY.

Berlin (Vox Haus), 505 m. (1½ kw.) 09.00, sacred con. (Sun.); 10.00, markets, news, weather; 11.00, con. and tests; 12.00, educ. hour (Sun.); 12.15, Stock Ex.; 12.55, time sig., news, weather; 14.15, Stock Ex.; 15.00, educ. hour (Sun.), markets, time sig.; 15.30, children (Sun., Wed.); 15.35, Esperanto (Sat.); 16.30, orch.; 18.20, educ. lec., women; 19.00, French (Mon.), lec.; 20.30,* con., weather, news, time sig.; 22.30, chess (Mon.), lec. (Tues.), dance (Thurs., Sat., Sun.).

* If operatic transmission, at 19.15. Will be increased to 81.10 kw.

Königswusterhausen (LP), 1,300 m. (20 kw.) 11.30, con., Esperanto (Sun.); 2.450 m. (5 kw.), Wolff's Buro Press Service: 07.30-21.00 3,150 m.: Telegraphen Union: 07.45-19.45 news. 4,000 m. (10 kw.): 07.00-21.00, news.

Berlin (Witzleben), about 500 m. (10 kw.) Testing shortly.

Bremen, 330 m. (1 kw.) Relay from Hamburg: 13.45, own con. (Sun.), 16.30 (daily).

Breslau, 418 m. (1½ kw.) 11.15, Stock Ex., weather; 12.00, con. (daily); Divine Service (Sun); 12.55, time sig. (Sun.), weather, Stock Ex.; 12.35, time sig. (weekdays), news, weather; 15.00, news; 16.00, children (Sun.); 17.00, con.; 19.00, lec.; 19.30, Engl. (Mon.), shorthand (Wed.), Italian (Thurs.); 20.30, con., weather, time sig.; news; 21.45, dance (Sun., Thurs.).

Cassel, 288 m. (1½ kw.) Relay from Frankfurt.

Dresden, 280 m. (1½ kw.) Relay from Leipzig.

Frankfurt-on-Main, 470 m. (1½ kw.) 08.00 sacred con. (Sun.); 10.45, Stock Ex.; 11.55, time sig., news; 12.55, Nauen time sig.; 15.00, Stock Ex., markets; 16.00, con. (Sun.), children (Wed.), markets, news; 16.30, con.; 17.00, children (Sun.); 18.00, markets, lec.; 19.00, Esperanto (Fri.), con. (Wed.); 20.00, lec., con., news, weather; 22.00, con. or dance (almost daily).

Hamburg, 395 m. (1 kw.) Sundays: 08.25, time sig., weather, news, lec., women; 11.15, sacred con.; 12.15, chess; 13.15, lec., con.; 14.30, chess; 17.00, children, con.; 19.15, Engl. sport, weather; 20.00, con. or opera, news (in English), dance. Weekdays: 06.55, time sig., news, weather, markets; 08.30, theatre news;

(Continued on page 802)

EFESCA

TAPPED COILS

The making of a tapped coil is a difficult task for the most enthusiastic amateur, and it is well to purchase complete units such as the Efesca series of tapped coils. In these the ideal has been attained in every respect—the winding is particularly accurate, each tapping is soldered up to its corresponding stud, and the whole unit is arranged for the Standard Efesca One-Hole Mounting to the panel. The unit incorporates a switch as an integral part and the tappings are so arranged that there are no dead ends.

Ask your Wireless Dealer to show you Efesca components, or write to us for Catalogue 522/8 describing Efesca Products.



EFESCA TUNED ANODE
An alternative method to H.F. Transformer Coupling. Must be used in conjunction with a variable condenser of .0003 to .0005 mfd. Wave-length range, 150 to 2,400 metres. Complete with self-contained split switch, knob pointed and scale, one-hole fixing, 21/- each.

Sold by all Wireless Dealers and Electricians.

Wholesale only—

FALK, STADELMANN & CO., Ltd.,

Efesca Electrical Works.

83-87, FARRINGDON RD., LONDON, E.C.1.

And at Manchester, Glasgow and Birmingham

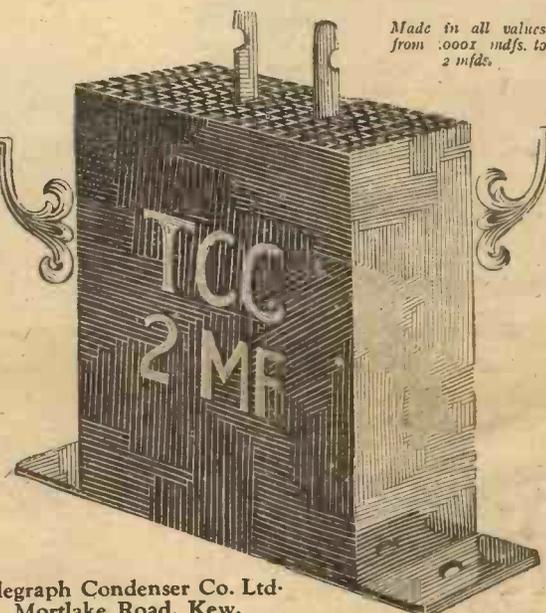


20 Years ago

It is twenty years since the first T.C.C. Condenser merited the approval of the electrical industry. When Wireless loomed ahead—we, as the largest condenser-building specialists in this country—were quick to realise its immense possibilities.

New plant was laid down—factories were extended—but still the demand for the familiar Green Condenser exceeded the available supply. Under such circumstances, any other firm might have been tempted to relax some of the restrictions which govern the quality in an effort to speed up production.

But twenty years of manufacturing experience have proved the wisdom of keeping faith with the public. A condenser for wireless use—nine times out of ten—is bought on the reputation of the maker. We are proud to think, therefore, that within three years many hundreds of thousands of T.C.C. Condensers have been chosen for the most strategical points of the Receiving Set.



Made in all values from .0001 mfd's. to 2 mfd's.

Telegraph Condenser Co. Ltd.
Mortlake Road, Kew.

Gilbert Ad. 2876



REAL TESTIMONY TO THE WORLD'S BEST RADIO CRYSTAL.

Knutsford.
"I don't claim to have reached Timbuctoo or Chili, but I get the local Broadcasting Station, which is 15 miles distant, even though slightly deaf, at comfortable strength. I hear every note, and that is all that counts.

I have tried umpteen kinds of crystal with varying degrees of efficiency, but the Gil-Ray is the NIBS."—E. M.

INSIST ON GIL-RAY THE GUARANTEED CRYSTAL

OUR GUARANTEE: We will gladly replace that does not give entire satisfaction.

In case of difficulty please send 1/6 and name of dealer to

GIL-RAY TRADING CORPORATION,
Sicilian House, Sicilian Avenue, London, W.C.1.
Telephone: Museum 3206.
TRADE ENQUIRIES SOLICITED.

PRICE
1/6
EACH

with silver cats-whisker

10/6 THE NEW PRICE

FOR THE C & S DULL EMITTER

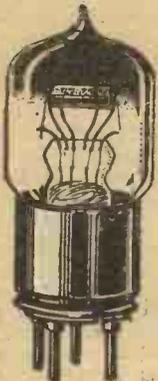
Zv.0.2a (227) which received NEW ZEALAND on a single valve (also made 0.06a (227L), now 13/6).

Special dry batteries for the valves—
227... 7/6 ... 227L ... 5/-

The valve that gives you increased amplification, clear musical reception, has a long life, and low current consumption.

CRAIK & SMITH (Desk B),
Allen St., Goswell Rd., London, E.C.1

'Phone: Clerkenwell 7346.



"BROADCAST TELEPHONY" (cont. from page 800)
12.15, markets; 12.55, Nauen time sig., shipping news; 14.45, markets, police news; 16.30, con.; 18.00, children (Mon., Tues.); 19.00, lec., Spanish (Mon., Thurs.); 19.30, English (Tues, Fri.); 20.00, con. or opera; 22.00, markets, news (in English), dance.

Hanover, 296 m. (1½ kw.). Relay from Hamburg. Also own con., 13.45 (Sun.), 16.30 (weekdays).

Königsberg, 463 m. (1 kw.). 09.00, sacred con. (Sun.), markets (Wed., Sat.); 12.55, time sig., weather, news; 16.00, markets; 16.30, con.; 17.00, con. (Sun.); 19.30, lec.; 20.00, con. or opera, weather, news, dance (irr.).

Leipzig, 454 m. (700 w.). 08.30, sacred con. (Sun.); 10.00, markets, news; 11.00, educ. hour (Sun.); 12.00, con. (daily); 12.55, Nauen time sig., Stock Ex., news; 16.00, markets; 16.30, con., children (Wed.); 18.00, markets, Stock Ex., lec.; 19.00, lec.; 20.15, con. or opera, weather, news; 22.00, con., cabaret or dance (not daily).

München, 485 m. (1 kw.). 11.30, lec., con. (Sun.); 14.00, time sig., news, weather; 15.30, markets; 16.00, orch. (Sun.); 16.30, con. (weekdays); 17.00, children (Wed.); 18.30, con. (weekdays); 19.15, lec.; 19.45, Engl. (Fri.); 19.30, con. (Sun.); 20.00, Italian (Mon.); 20.30, con., news, weather, time sig.; 22.00, late con. (irr.).

Munster, 410 m. (2½ kw.). 11.45, Radio Talk, Divine Serv.; 12.00, news (Sun.); 12.30, news (weekdays); 12.55, Nauen time sig.; 15.30, news, time sig.; 16.00, con.; 17.00, children (Sat.); 19.40, news, weather, time sig., lec.; 20.25, women (Mon.); 20.30, con.; 22.00, Engl. (Tues., Fri.), Spanish (Mon., Thurs.), Esperanto (Wed.).

Nuremberg, 340 m. (800 w.). Relay from Munich.

Stuttgart, 443 m. (1½ kw.). 11.30, con. (Sun.); 16.30, con. (weekdays); 17.00, con. (Sun.), children (Wed., Sat.); 18.30, time sig.,

news; 19.00, lec.; 19.30, Esperanto (Thurs.), Engl. (Wed.); 20.00, con. (daily); 21.15, time sig., late con. or cabaret.

ESTHONIA.

Reval, 350 m. Testing.

FINLAND.

Helsingfors, 370 m. 09.00, sacred service (Sun.); 18.00, time sig., weather, news, opera (daily).

HOLLAND.

Amsterdam (PCFF), 2,125 m. (1 kw.). Daily: 08.35-16.50 (exc. Mon. and Sat., when 10.50-11.50), news, Stock Ex. (PX9), 1,070 m. (400 w.), 21.20, con. (Mon.). (PA5), 1,050 m., 20.20, con. (Wed.).

Hilversum (HDO), 1,060 m. (2½ kw.). 10.40, sacred service (Sun.); 12.20, news; 14.50, con. (Sat. and Sun.); 18.20, children (Mon.); 20.20, con. or lec. (Wed., Fri.), relay of Mandelberg con., Amsterdam (Thurs.), opera or con. (Sat.).

Bloemendaal, 345 m. 10.20 and 17.20, divine service (Sun.).

ITALY.

Rome (IRO), 425 m. (2½ kw.). 10.45, sacred service (Sun.); 13.00, news (irr.); 16.45, children, Stock Ex., orch. relayed from Hotel di Russia, news; 20.45, con., news, dance; 21.15, Esperanto (Mon.).

NORWAY.

Oslo, 380 m. (500 w.). Testing, daily, about 20.30. **Aalesund**, 515 m. Testing.

POLAND.

Warsaw (PTR), 385 m. (¼ kw.). 18.00; 20.00 (irr.).

RUSSIA.

Moscow (Central Wireless Station), 1,450 m. Sundays: 13.45, lec.; 16.30, news and con. Weekdays: 14.00, markets; 16.30, news or con.

(Sokolniki Station), 1,010 m. Sundays: 15.30, con.; 18.00, lec. and con. (Tues., Thurs., Fri.).

(Trades Union Council Station), 450 m. 18.00, con. (Mon., Wed.).

SPAIN.

Madrid (R1), 392 m. (3 kw.). Sundays: 19.00, time sig., con., lec. Weekdays: 13.30, news, lec.; 19.00, *La Libertad* con. (Tues., Thurs., Sat.); 23.00-01.00, Radio-Madrid con., time sig., lec. (Mon., Wed., Fri.).

Barcelona (EAJ1), 325 m. (600 w.). 18.30, lec., markets, Stock Ex., con.

Bilbao (EAJ8), 415 m. (1 kw.). 20.00, con., news.

Seville (EAJ5), 350 m. (1 kw.). 19.30, con., news, weather.

Cartagena, 300 m. (500 w.). 18.00, tests.

SWEDEN.

Stockholm (SASA), 427 m. (500 w.). Sundays: 10.55, sacred service; 17.00, children; 18.00, sacred service; 20.00, con.; 21.00, news, con., weather. Weekdays: 12.30, weather, Stock Ex., time sig. (12.55); 20.00, lec. (irr.), then same as Sun.; 22.00, dance (Wed., Sat.).

Gothenburg* (SASB), 290 m. (500 w.). 10.55, sacred con. (Sun.). From 12.30 onwards S.B. from Stockholm.

Malmö* (SASC), 270 m. (500 w.). As Gothenburg.

Sundsvall* (SASD), 545 m. (500 w.). As Gothenburg.

Boden* (SASE), 2,500 m. (500 w.). As Gothenburg.

Falun (SMZK), 370 m. (250 w.). 20.00, S.B. from Stockholm thrice weekly.

Joenköping (SMZD), 265 m. (250 w.). See Falun.

Norrköping (SMVV), 260 m. (250 w.).

Karlstad (SMX9), 370 m. (250 w.).

Trollhättan (SMXQ), 345 m. (250 w.), as Falun.

* Local programmes are also broadcast at times.

(Continued in first column of page 80.)

Charges while you sleep

4.15.0

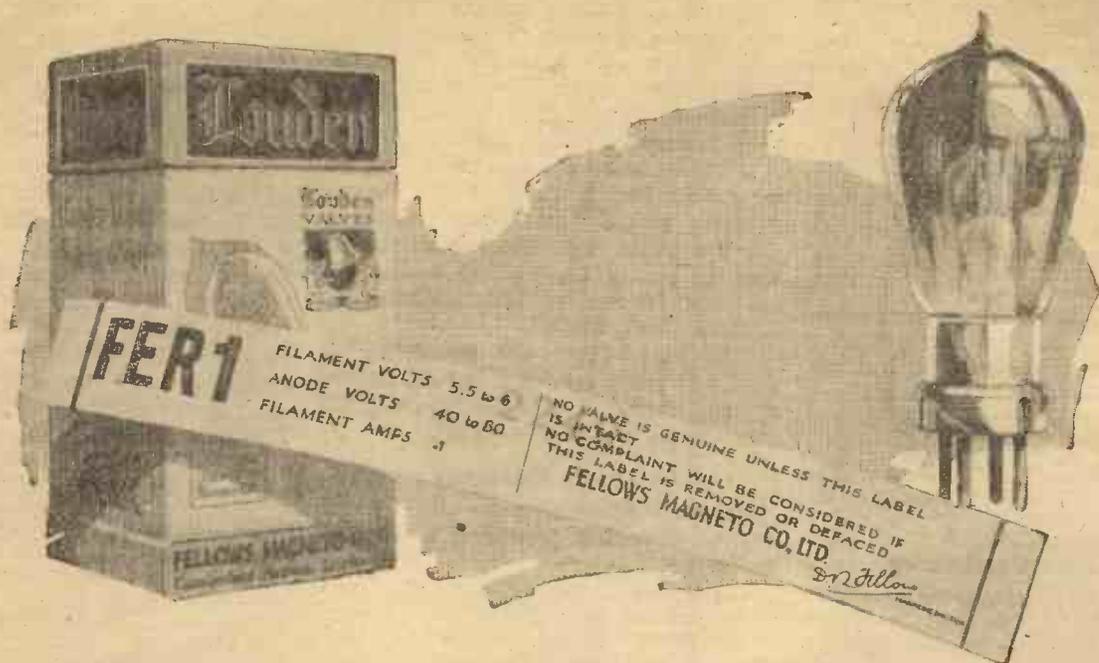
Needs no attention, charges while you sleep, priced within the reach of every wireless enthusiast.

SIMPLE CONVENIENT EFFICIENT

Write for leaflet A.W. free on application. Trade Enquiries Invited.

PHILIPS
RECTIFIER

ADVERT OF PHILIPS LAMPS LTD 60 WILSON ST LONDON E.C.2.



This seal —

is a token of our responsibility for the Louden Valve. It bears the signature of Mr. D. V. L. Fellows and is a sign that the valve has been tested in our works and found correct.

In future, therefore, when you buy a Louden Valve make certain that this seal is intact and not defaced in any way. You will then be assured that if by any chance you should have to make a complaint regarding the valve, your complaint will receive the attention it deserves.

You can further safeguard yourself by seeing that the Louden you are buying is supplied in the new blue and white box illustrated here, or in the original purple and yellow box in which Loudens were first placed on the market.

These precautions are for your protection; they ensure that other valves of similar appearance, but of inferior construction and performance, cannot be offered to you without your being able to detect the substitution.

Remember the seal and the box, then; for though these imitations may be very flattering to us they can only be a source of disappointment and expense to you.

Ask your retailer for Louden Valves, and see that you get them.

Louden Bright Filament Valves Types F1 and F2. Filament Volts 4.8-5. Filament Amps. 0.4. Price **8/6**

Louden Dull Filament Valves Types FER 1 and FER 2. Filament Volts 4, Filament Amps. 0.1. Price **13/6**

FELLOWS WIRELESS

Advt. of the Fellows Magneto Co., Ltd., Park Royal, London, N.W.10

CORRESPONDENCE (continued from preceding page)
 the protective tissue-paper covering from the face of the transfer by slightly dampening it.—H. W. (Wolverhampton).

Other Correspondence Summarised

J. G. R. (S. Wales) wishes to make known the generous treatment which he has received from the Cossor Valve Co., Ltd. They changed two W2 Wuncell valves and only sent a receipt for the faulty valves.

K. H. R. (Croydon) has received all the main B.B.C. stations, one relay, twelve Continental stations, W G Y, and thirty-five British amateurs on his home-made one-valve set.

E. A. (Bournemouth) wishes to acknowledge the generous treatment he has received from Messrs. Bretwood, who kindly changed a faulty grid leak without making any charge.

TRADE NOTES

FROM J. H. Taylor and Co., of Macaulay Street, Huddersfield, we have received a comprehensive price list and catalogue of wireless components, conveniently arranged in alphabetical order.

From S. G. Brown, Ltd., of Victoria Road, North Acton, W.3, we have received an interesting catalogue of telephones, loud-speakers, amplifiers, etc. The catalogue is well illustrated, and contains full details of many new types of loud-speakers.

"BROADCAST TELEPHONY" (cont. from page 832)

SWITZERLAND.

Lausanne (HB2), 850 m. (500 w.). 08.05, weather; 13.30, weather, markets, time sig., news; 17.00, children (Wed.); 18.55, weather, news; 21.15, con. (exc. Wed.), dance (Thurs. and Sat.).

Zurich (Höngg), 515 m. (500 w.). 12.00, weather; 12.55, time sig., weather, news, Stock Ex.; 16.00, con. (exc. Sun.); 18.15, children (Mon., Wed., Thurs., Sat.); 19.00, weather, news (exc. Sun.); 20.15, lec., con., dance (Fri.); 21.45, news.

Geneva (HB1), 1,100 m. (temp.). New station shortly testing.

**FOUR
 "AMATEUR WIRELESS"
 HANDBOOKS—1s. 6d. EACH**

**WIRELESS TELEPHONY
 EXPLAINED**

**SIMPLE CRYSTAL
 RECEIVING SETS**

**WIRELESS COMPONENT
 PARTS**

**SIMPLE VALVE
 RECEIVING SETS**

From all newsagents and booksellers, 1/6 net each, or post free by return 1/9 from the Editor of "Amateur Wireless," La Belle Sauvage, London, E.C.4.



R.I. adds yet another success to its list of wireless components for the perfection of wireless reception.

Here we have a sectional view of the new R.I. Aerial Tuning Inductance with variable Aerial Reaction designed for panel mounting and covering a wavelength range of from 175-4,000 metres.

The unit is better, and in addition, is cheaper than a complete set of coils.

It comprises a cylinder of paxolin on which is wound a number of turns of silk-covered wire, with eight tapping points leading to a special dead end switch fitted in a panel, which is secured to one end of the cylinder. The aerial reaction is operated from the front of the panel by means of a fine bevelled gearing which gives a beautiful smooth action, allowing adjustment to the finest degree. A large black ebonite dial, suitably engraved with two scales, one indicating the tapping points and the other degrees of reaction, is supplied with each instrument and can be used as a drilling gauge for fixing the unit to the panel of the receiving set.

This R.I. component ensures correct and efficient aerial reaction over the entire range of wavelengths in a manner almost impossible with plug-in coils.

The special dead end switch entirely eliminates all energy loss, and when used in conjunction with a variable condenser it practically forms a complete receiving circuit.

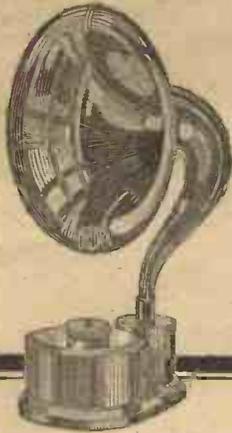


PRICE 39/6

Write for leaflet 'A.W.', free on application.

12 HYDE ST. NEW OXFORD ST LONDON W.C.1.

Contractors to the Admiralty and all Government Departments



The Crystal Set Loud Speaker

If your Crystal Receiver gives signals that are loud enough to be heard with the headphones held 12 inches from the ear, it will work a Crystavox Loud Speaker. With the Crystavox there are no valves to buy and no accumulators to be continually recharged. First cost is last cost—the only maintenance is the replacement once every six months or so of a small inexpensive Dry Battery.

The Crystavox is a full size Loud Speaker giving sufficient volume to fill a room of average size with clear mellow tone free from the distortion that is often inherent with every Valve Set. For economy of upkeep and purity of tone it is entirely without equal. See your Dealer about it to-day.

£6 : 15 : 0

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67 HIGH ST., SOUTHAMPTON

Brown

Gilbert Ad. 2861

CHIEF EVENTS OF THE WEEK

SUNDAY, May 17

London	9.0	Music of Italy.
Birmingham	4.0	Band of H.M. Grenadier Guards.
Birmingham	9.0	Bach Programme.
Cardiff	9.0	Instrumental Concert.
Manchester	3.30	<i>La Traviata</i> (Verdi).
Newcastle	8.30	Symphony Concert.
Aberdeen	4.0	Chamber Concert.

MONDAY

London	8.30	
ALL STATIONS	10.5	Act III of the Opera, <i>Der Rosenkavalier</i> (Strauss).
Cardiff	8.0	Band of H.M. Grenadier Guards.
Aberdeen	8.20	Sea Songs and Sea Chanties.
Glasgow	8.0	Memories and Drama.

TUESDAY

Manchester	1.15	Concert relayed from Houldsworth Hall.
Scottish Stations	11.0—12.0	Opening Ceremony of the General Assembly of the United Free Church of Scotland.
Scottish Stations	1.0	Speeches by the Earl of Elgin and Kincardine, and the Moderator.

WEDNESDAY

London	8.0	Historical Pictures in Music.
Birmingham	8.0	An Evening with the Operas.
Bournemouth	8.0	Band of H.M. Grenadier Guards.
Cardiff	8.45	<i>May Day</i> or <i>The Little Gypsy</i> (Arne)
Newcastle	8.0	Selections from Opera.
Glasgow	8.0	Beethoven, Elgar, and Wagner.
Belfast	7.30	Symphony Concert.

THURSDAY

London	8.0	Band of H.M. Coldstream Guards.
ALL STATIONS	10.20	Act III of the Opera <i>The Valkyrie</i> .
Bournemouth	8.0	Some British Composers.
Cardiff	8.0	Beauty in Music.
Manchester	8.0	Vocal and Instrumental.
Aberdeen	8.0	Ballad and Opera.
5 X X	8.0	Concert Party, Song Recital, and Chamber Music.

FRIDAY

London	9.0	Ballad Programme.
Birmingham	8.0	Chamber Music.
Manchester	7.30	Concert in aid of the Salford Royal Hospital.
Newcastle	8.0	<i>Macbeth</i> (Shakespeare.)
Glasgow	8.0	Song, Piano, and Orchestra.
Leeds-Bradford	8.0	Memories of Old Yorkshire.

SATURDAY

London	8.0	"Melody."
Bournemouth and 5 X X	8.0	Band of the Royal Tanks Corps.
Manchester	9.0	Chamber Music.
Newcastle	8.0	An Acoustic.
Belfast	8.0	Empire Day Programme.

A VISIT TO THE CHLORIDE WORKS

REPRESENTATIVES of the press were recently afforded an opportunity of visiting the Chloride Works at Clifton Junction, Manchester, to inspect the various processes of accumulator manufacture and to view the vast extensions to the factory necessitated by the great demand for Exide batteries.

Ideally situated in pleasant surroundings, the works are practically self-contained, nothing but raw material entering the works.

The first process viewed was the pressure casting of the positive and negative plates. The two halves of a delicately-sunk die come together, and the lead is literally squirted under high pressure into every crevice of the die, the result being a faultless lead casting of intricate formation.

The two halves forming each plate pass on to the riveters, the rivets being of lead and an integral part of the casting. The pasters next fill the riveted plates with the paste, spreading this on with a knife

and forcing it into the interstices of the lace-like casting.

The bridge pieces are cast with the brass terminals, and in turn the plates are attached to the bridge pieces by the process of lead burning, a jig being used to space the plates while they are being burnt on to the bridge.

The wooden separators are sawn and planed, then pressed to uniform thickness between heavy rollers, which hardens them. These separators are immersed in wax prior to assembly to render them acid proof.

The celluloid cases are formed from sheet celluloid round wooden jigs, and sealed with amyl acetate. After filling with acid, each accumulator is submitted to test under charge and discharge, a rigid system of inspection between each process ensuring faultless results.

The raw materials, such as lead, ebonite and celluloid, are tested both as to their composition and electrical properties before passing on to the manufacturing processes, and the complete battery goes through a final test before passing for sale. Raw materials literally go in at one end of the works and emerge at the other in the form of small and large accumulators of every type for every purpose.

A well-equipped chemist's and research laboratory incessantly experiments in an endeavour to find improvements, both as to the batteries themselves and as to methods of manufacture.

As to the additions to the factory, six 150-ft. sheds have been erected, two for house joiners' machinery, three for the manufacture of separators and forming plates, and one to cope with the extra packing necessary. Many other sheds are in process of erection.

"Restranging a Tennis Racket" is the subject of a well illustrated and described article appearing in the current issue of THE AMATEUR MECHANIC AND WORK (3d.), and will doubtless prove useful to many readers. Other articles appearing in the same number are: "Distemping a Ceiling"; "A Useful Wheel Drawer"; "Grinding Small Twist Drills"; "Motor-cycle Magneto Troubles"; "A Loud-speaker 2-valve Set"; "A Useful Battery Connector"; "Building a Cupboard Bookcase"; "Staining Wood Chemically"; "Outdoor Photography"; "Spinning Small Articles in Metal."

Nottingham possesses the first wireless school. In this a class of forty girls receive music and lessons broadcast from the local station by means of a receiver and loud-speaker.

THE NATURAL CRYSTAL

ETHITA

Trade Mark

IS SECOND TO NONE

Sample post free is. Please send local dealer's name, etc.

Proprietors: THE BRIGHT CO., LONDON, N.8.

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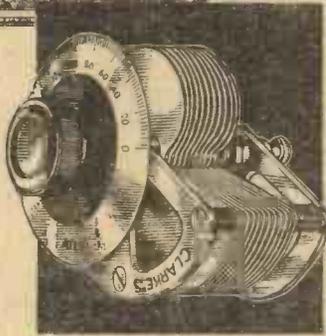


Read the report of the test made by the National Physical Laboratory—impartial evidence of ATLAS efficiency.

"The effective series resistance of the condenser was measured at a frequency of 1,000 kilocycles per second with the condenser set at its maximum capacity. The effective series resistance was found to be less than 0.1 ohm."

PRICES:

.001	13/6		.0003	11/-
.00075	12/3		.00025	10/9
.0005	11/6		.0002	10/6



PROMISE. The latest addition to the famous "ATLAS" Range is the new Square Law Low Loss Variable Condenser, and once again promise is even excelled by actual performance.

A few of the outstanding features of the "ATLAS" Square Law Low Loss Condensers are:

Fixed vanes are insulated from moving vanes by ebonite tubes outside the electrostatic field, losses are further reduced by the end plaques which instead of being "full" are "cut-away."

It gives straight line tuning—of course.

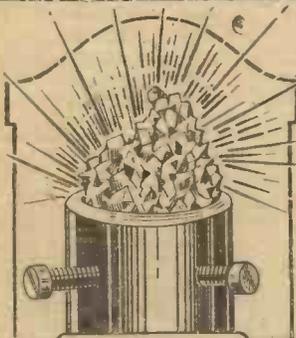
Has low phase angle difference and power factor.

There are dozens of sound reasons why the man who wants the finest condenser will eventually choose

CLARKE'S
"ATLAS"
SQUARE LAW LOW LOSS
CONDENSER

Type A. Prov. Pat. No. 5030/25.

H. CLARKE & CO. (Mer.) Ltd., Radio Engineers, ATLAS WORKS, OLD TRAFFORD, MANCHESTER.



I go on
for ever

And like Tennyson's Brook—I sparkle with life all over—I haven't a dull spot, I'm "DAYZITE"—the world's most perfect crystal.

By merit alone "Dayzite" has worked its way to the forefront of Radio Crystals. Not a dull spot—never a let-down. Why? Because it is composed of natural compounds which render it the only real stable, rectifying, tone-giving

crystal. Were testimony needed to the efficacy of "Dayzite," we could fill this book with the written evidence of satisfied customers. Here is one typical of the many.

"I heard 2LO at Brussels quite distinctly on a 'DAYZITE CRYSTAL.'"
A. J.

"DAYZITE" REGD.

The Radio Crystal that made Broadcasting popular.

Send to-day enclosing P.O 2/6, and commence getting perfect reception. Price List Free (mention "Amateur Wireless") from

WILL DAY, LTD.,

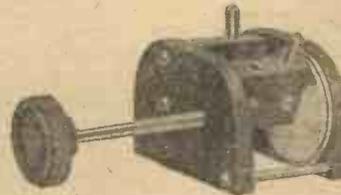
19, Lisle Street, Leicester Square, LONDON, W.C.2.

Phone: Regent 4577. Telegrams: "Titles, Westrand, London."

2/6
EACH
SOLD ONLY
BOXED WITH
SILVER
CAT'S WHISKER

ADDS CHARM AND EFFICIENCY TO ALL RECEIVING SETS.

"LOTUS" Cut Geared Vernier COIL HOLDER

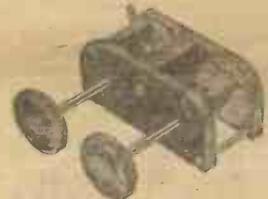


Vernier Movement, actuated by Three Sets of Encased Precision Cut Gears, representing a Reduction of 8 to 1.

Moving Block Cannot Fall.

"LOTUS" COIL HOLDERS are made from BAKELITE MOULDINGS, with Nickel-Plated Brass Parts.

Retail Selling Price Two-way, 7/- Three-way, 10/6



Garnett, Whiteley & Co., Ltd.

Lotus Works, Broadgreen Road, Liverpool.

CHOSEN BY EXPERTS



*For Master
Detection—*

MULLARD DOUBLE WHITE RING MASTER VALVES

ALL wireless receivers need a superior detector. Perfect rectification is the first essential for perfect reception.

The use of general purpose valves or valves with H.F. or L.F. operation in addition to rectification was satisfactory to many of the Radio public up till to-day, but

NOW

as a result of improved apparatus, searching tests and expert experience

YOU can have A VALVE SPECIALLY FOR DETECTION; this means that your radio rectification will be **purser and stronger.**

MULLARD DOUBLE WHITE RING VALVES ARE REAL MASTER DETECTORS.

They are **specially selected** for the detector stage in **YOUR** set.

Obtainable from all dealers in two types

MULLARD DOUBLE WHITE RING DETECTOR VALVES

Type D·3 for accumulators (1·6-2 volts) 14/- each

Type D·06 for dry cells (2·5-3 volts) 16/- each

Ask your dealer, he knows best.

YOU can also obtain Mullard Master Valves for H.F. and L.F. operations in the same types.

Mullard

THE · MASTER · VALVE

Advert of THE MULLARD RADIO VALVE CO., LTD. (A.W.), Nightingale Works, Balham, S.W.12.

LISSENIUM.

Take away the roar!

The loud speaker which

roars out with a raucous tone is not a pleasant thing to listen to.

Use a LISSEN CHOKE coupled amplifier, and it will take away the roar and bring in its place a pleasant tone and clear, refined volume.

LISSEN CHOKE amplification is rapidly becoming popular. Amplifiers may consist of LISSEN CHOKES throughout, connected up as below, or a combined transformer (preferably use one of the LISSEN types) and LISSEN CHOKE amplifier can be evolved.

LISSEN CHOKE coupling of L.F. valves is a convenient way of obtaining pure sound without the disadvantage of using the high H.T. voltage necessary when resistance capacity coupling is employed.

Those who think there is room for improvement in their loud speaker reproduction, should try the effect of a LISSEN CHOKE AMPLIFIER, one, two, or more stages. Not quite so loud per stage as transformer coupled, but very pure.

CHANGE OF ADDRESS

Our Works at Shepherd's Bush were quite inadequate for satisfactorily dealing with our rapidly increasing production of LISSEN PARTS. We have consequently acquired much larger and more convenient premises from which we shall be able to give even better service and immediate delivery. No wireless dealer should be without an ample stock of LISSEN PARTS, and we should like any reader of this publication who experiences any difficulty in obtaining his requirements, to write to us, mentioning the name of his usual wireless dealer. Dealers also are asked to send for a copy of our latest TEXT BOOK. OUR NEW ADDRESS IS—

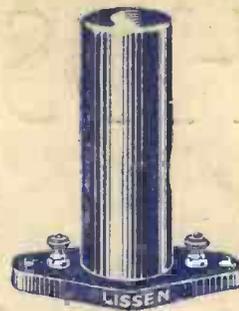
LISSEN LIMITED

LISSENIUM WORKS,

16-20 FRIARS LANE, RICHMOND, SURREY

Richmond: 2285 (Private Exchange). Telegrams: LISSENIUM, LONDON.

LISSEN PARTS—WELL THOUGHT OUT, THEN WELL MADE



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10/-

How to connect:—

One terminal of the LISSEN CHOKE is connected to the plate of the preceding valve, the other terminal to the H.T. battery. A fixed condenser of .01 capacity is connected between the plate of the preceding valve and the grid of the L.F. valve and a grid leak (preferably a LISSEN VARIABLE GRID LEAK) is connected between the grid of the L.F. valve and the L.T. negative. Grid cells should be introduced between the Grid Leak and L.T. negative if they are found necessary. Each succeeding stage is connected in the same manner.

PARTS WHICH TRANSLATE INTO SOUND THE INVISIBLE ACTIVITIES OF MINUTE ENERGY—build with all LISSEN parts—there is one for every vital place.

Put a fine edge
on your tuning
with LISSENSTAT
control.

LISSENSTAT Minor ... 3/6
LISSENSTAT Major ... 7/6
LISSENSTAT Universal 10/6

Sensitivity--and
its allied control

LISSEN
Variable
Grid Leak 2/6