HAS TELEVISION ARRIVED?

Amateur Wireless

And Electrics

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PRINCIPAL CONTENTS

WELL ILLUSTRATED

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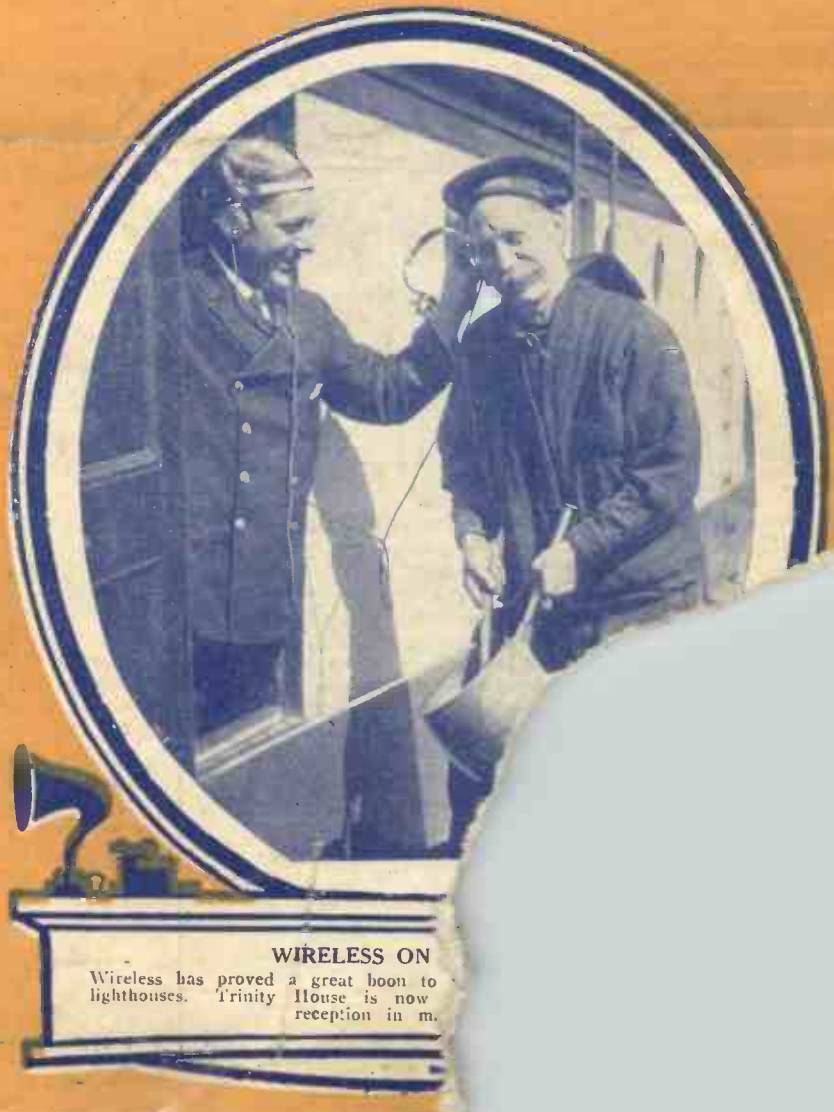

WIRELESS ON

Wireless has proved a great boon to lighthouses. Trinity House is now reception in m

Amateur Wireless and Electrics

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LOCATING FAULTS IN THE SUPER-HET

THE majority of straight circuits present little difficulty to the home constructor should anything go wrong; if a difficulty is encountered, someone amongst one's wireless friends probably has had and overcome the same difficulty and can offer practical advice. On the other hand, super-hets are less well known in Europe, and their owners must rely largely upon their own initiative in tracing any faults.

This, of course, does not apply to the constructor who builds a set exactly to definite instructions; he usually meets with success, but when an original layout is designed faults occur which give rise to mediocre results or absolute failure, and it appears that the number of possible errors increase as the square of the number of valves.

In the case of failure the cause will be difficult to locate unless a systematic method of fault-finding is adopted.

Apparent Failure

Sometimes apparent failure to function is due to the extreme selectivity of this type of receiver. For example, an enthusiastic amateur, a friend of the writer, spent ten minutes finding 2LO with a seven-valve super-het. If it so happens that one condenser is half a degree from resonance no amount of turning of the second condenser will bring in the required station.

The writer proposes to detail a scheme whereby each unit of the set can be tested separately and the settings of the condensers found approximately.

Fig. 1 is a conventional diagram of typical super-heterodyne circuit employing the second harmonic method of wave changing; the actual circuit is unimportant since the method is the same in each case. Attention will be drawn to any exceptions. It is not necessary to construct the units separately in order to carry out the tests; the set can be wired complete, omitting only the connections between points, AB, CD, EF, GH, JK.

The First Detector

The majority of faults usually occur in the first detector, so it is advisable to test this unit first. The connection of a pair of telephones between points A and D is the only alteration necessary. If the local broadcasting station is within loop-aerial range this will suffice; at greater distances a large aerial must be coupled to the frame by an aperiodic coil of one or two extra turns. The setting of the condenser C1 should be noted, as this will approximate the position when used with the complete set.

The coil L3 of the oscillator coupler is now coupled to L2 (up to this point in the test it should be kept at right angles); tuning is carried out by the second condenser C2 in such a manner that the second harmonic of the oscillation so generated produces a beat note with the received signal. If no oscillation is produced the leads of L2 or L3 must be reversed. In the case of the super-tropodyne or heterodyne using a separate oscillator, the beat note is produced by the fundamental. The final condenser setting will be slightly in advance of the audible beat-note position, since the frequency difference for audibility is below 10,000, while the majority of intermediate frequency amplifiers are tuned to about 35,000. The actual difference with a .0005 microfarad condenser within the broadcast waveband will be about 5 degrees.

The testing of the second detector is a simpler matter. As before, the telephones are connected in the plate circuit between points J and L and an aerial and earth including a tuning system suitable for reception of the local station is wired across points F and H, the aerial being attached to F. When the detector is functioning properly points J and K can be bridged and the note-magnifier tested.

Intermediate-frequency Amplifier

The last unit to test is the intermediate-frequency amplifier, and since a detector is necessary for aural tests, point G should be permanently connected to H, and F temporarily connected to E; the reason for this will be clear later. An earth and aerial connected at points C and B respectively of the primary of the first filter transformer should be approximate enough to receive one of the long-wave commercial stations. If the waveband corresponding to the natural amplifying frequency of the amplifier happens to be unoccupied, the temporary addition of a variable condenser in series should bring in several stations suitable for testing purposes. The condenser must not be added in parallel, for although the following stages are flatly tuned, the addition of the condenser will throw the filter completely out of resonance with the remainder of the amplfier. It is obvious when using a tropodyne or any other circuit employing sharply-tuned intermediate-frequency amplifiers, every transformer must be tuned to resonance—an easy operation when using tropoformers.

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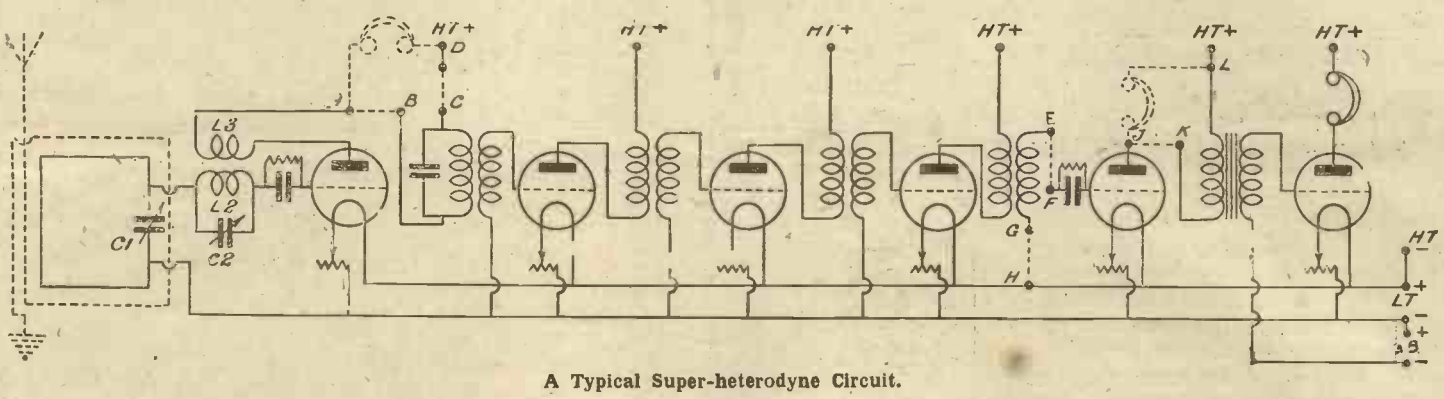
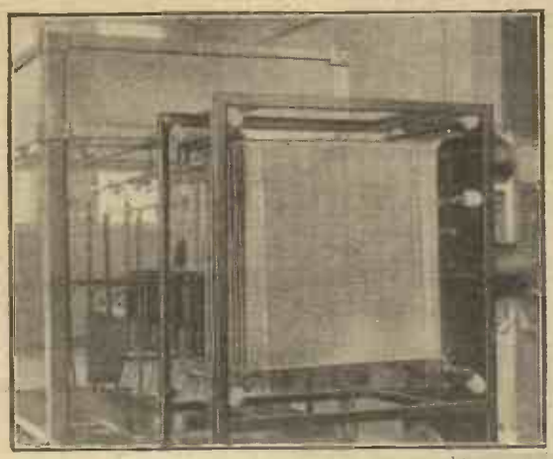


A Typical Super-heterodyne Circuit.

DAVENTRY: *Official Opening, July 27, 1925*

NEXT Monday, Daventry, the new high-power station of the B.B.C., will be opened by Sir W. Mitchell-Thomson, the Postmaster-General. This station (which takes the place of the present 5 X X at Chelmsford) will be of great importance to the amateur owing to its position and high power, and its inauguration is looked to with very considerable interest throughout the country.



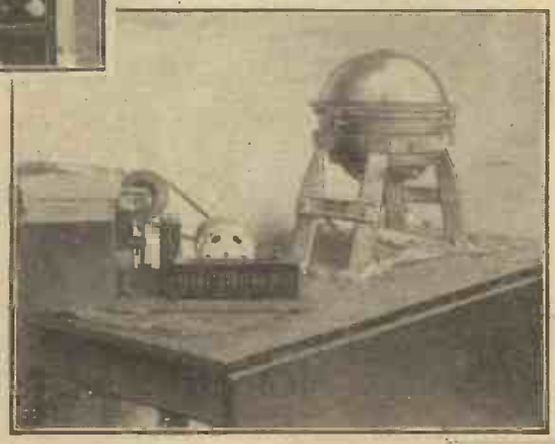
High-frequency Choke.

Daventry, of course, appeals particularly to the crystal-set user, and it is calculated that, whereas about 78 per cent. of the population of the British Isles are now within crystal range of one station or another, the power and unique position of this newest station will bring this figure up to 90 per cent. The valve user will also benefit, especially those in remote districts, who will thus be provided with another station which will yield loud-speaker results.

Rapid progress is being made in the testing and final arrangements of the apparatus. The following are a few additional details to those which we have given in previous issues.

Masts

The masts are of the triangular steel-latticed type and are 500 ft. high. Each mast is fitted with a warning light to aircraft at the top. The earth system consists of a ring of zinc plates, 200 ft. in diameter, with the power-house as a centre. Radial wires stretch from the power-house to these plates, and are connected to a common ring near the aerial lead-in. There is, in addition, a buried earth underneath the power-house itself, to which will be earthed the frames of the machines and the transmitting plant.

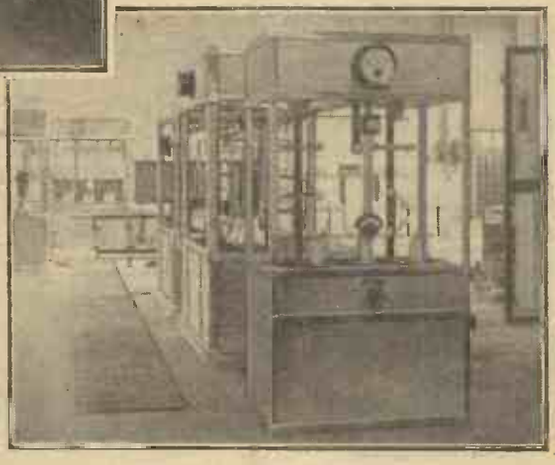


Electric Lamp for Top of Mast.

The aerial is of the T type, the top span of which is 600 ft. long, and the vertical length is approximately 450 ft. There will be six wires in the aerial, spaced by hoops 6 in. in diameter.

The power-house and offices are combined in one brick building. The wireless room is the largest room of all, and in addition there are a small test studio, instrument room, battery room, amplifier room, and two offices.

The power of the station will be 25 kilowatts to the oscillator, the wavelength 1,600 metres, and call-sign, 5 X X, are the same as of Chelmsford.



Sub-control Panel Modulator.

TEMPORARY PANELS

IT sometimes happens that one wishes to test the efficiency of a circuit before building up a set permanently, and as this test entails perfect insulation, nothing is available but ebonite for the panel. Ebonite panels are expensive, however, and the writer surmounts the difficulty in the following manner.

Most wireless shops cut panels to size for customers, and in the course of a few weeks accumulate a large quantity of strips which they are glad to let their customers have at a nominal price.

The writer constructs these into a panel by screwing them on to two pieces of hard wood ½ in. by ¾ in. by, say, 12 in., or according to the size of the panel required, the strips being fastened across as the rungs of a ladder, being spaced according to requirements.

A firm job results if the wider pieces are fastened by two screws at each end. For the narrower ones, of course, one screw at each end will hold the strip quite securely in position.

C. B.

"LOCATING FAULTS IN THE SUPER-HET"

(*continued from preceeding page*)

If the test yields no result the faulty amplifier can be found by connecting the point F to the respective grids (hence the temporary connection); note that the filaments of the amplifiers not in use during this test should be switched off.

It is a good idea to connect the wire ends at points A, B, C, D, etc., to valve legs, then the temporary connections can be made by means of lengths of flex with valve pins attached to the extremities. Suitable tests for components of a faulty unit have been described thoroughly in this journal and need no reference here.

When every fault has been eradicated the omitted connections can be made and the set tried out complete. As the settings of the variable condensers are known approximately, the reception of the local station should be accomplished with greater facility.

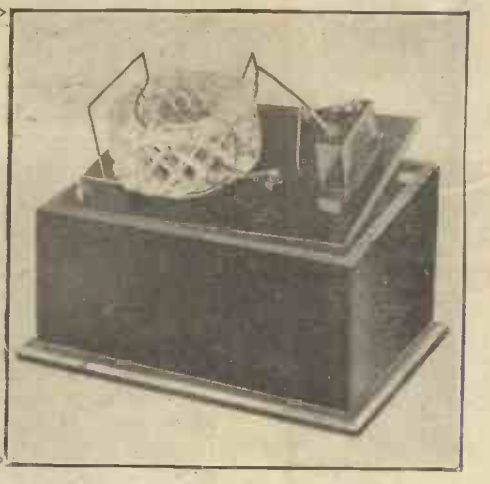
Values of components should not necessarily be adjusted so that each unit functions most efficiently alone. For instance, the grid leak in the first detector must be of a lower value than is required for good rectification, so that the valve is worked on the lower bend of the characteristic curve, which is necessary to produce a fundamental rich in harmonics.

B. H.

The Mayor of Deptford has undertaken to raise money to equip with wireless all the beds in the Miller General Hospital, which does such a great work in south-east London.

The Complete Receiver.

A SIMPLE LOW-LOSS CRYSTAL SET



View showing Under Side of Panel.

THERE is no doubt that the low-loss coil has come to stay. Its efficiency over the ordinary types of coil can easily be demonstrated by anyone who possesses a sensitive micro-ammeter. For instance, suppose that a crystal set having a circuit diagram as shown on this page, but made with an ordinary cylindrical coil of No. 26-gauge wire is tuned in to the local station, and the micro-ammeter is placed between the crystal and phones and the reading noted; then the ordinary coil is replaced with one of the low-loss type as seen in the top right-hand photograph, the reading of the micro-ammeter will be greater than before, thus showing that the low-loss coil actually passes or causes the passage of more "juice" through the phones and crystal.

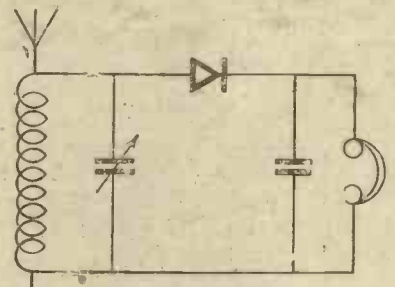
Winding the Coil

The coil used in this crystal set is wound on a former made from part of an old broom handle and a few french nails. Round the circumference, spaced at equal intervals, of the broom handle are hammered in two rows of nails ¾ in. apart, each row containing fifteen nails. The nails are so arranged that one nail of one row is exactly opposite the space between two nails of the other. The coil is wound with No. 18 gauge wire. Start winding at a nail in one row and, crossing over to the other row, wind round the outside of the third peg from the start. Now cross over to the first row again and wind round the outside of the fifth nail from the start (that is the *sixth* including the first). Cross over again to the opposite row and so on until 40 complete turns round the former have been made.

This completes the actual winding of the coil, but before it is removed from the former it should be bound together with stout cotton to prevent the turns from springing apart. The two ends of the winding should be left sticking out about ½ in. for connecting purposes.

The Panel

We can now turn our attention to the panel which measures 6¾ in. by 4¼ in. by $\frac{3}{16}$ in. thick. As this is not a standard size it will be necessary to cut and trim up the sides. It is not generally known that ebonite can be broken along a straight line much easier and quicker than it can be cut. The best method of doing this is as follows. Mark out on the ebonite sheet to be cut the exact size of the panel required. Along these marks lay a steel straight-edge and with a sharp steel point make fairly deep grooves (not less than $\frac{1}{16}$ in. deep). Then place the ebonite sheet on the edge of the table so that the groove on the panel and the edge of the table coincide. With a sharp blow of the hand the superfluous ebonite will break off along the groove, leaving a clean fracture. The edges may be finished off with emery-cloth.



The Circuit.

The next step in the construction is the drilling of the panel. Along the major centre line of the panel drill two holes 2 in. from each end for the crystal detector and the variable condenser. Four other holes round the edges of the panel are required for fixing the terminals and two more for mounting the .002-microfarad fixed condenser across the phones.

Assembly

Having drilled the panel the components may be mounted and wired up. It will be noticed from the photographs that while a condenser dial is seen on the top of the panel yet on the under side no variable condenser is visible, the apparent illusion being due to the fact that the condenser is enclosed in the dial itself! This instrument, known as the Dialodenser, is made by The Portable Utilities, Ltd., and possesses a remarkable minimum capacity and gives a smooth increase in capacity up to .0005 microfarad. The condenser is mounted on the panel by the popular one-hole fixing screw. On the under side of the panel directly underneath the condenser is mounted the coil. Any convenient method of fixing the coil to the panel may be employed, but it will be found that the thick wire used for the connections (No. 16 or 18 S.W.G.) is quite sufficient to keep the coil in position.

The crystal detector is of the vertical type made by The National Wireless and Electric Co., Ltd. It is mounted on the panel by a one-hole fixing device which also serves the purpose of a sub-panel connection with the catwhisker. Another hole must be drilled so that a connection can be made to the crystal.

Operation

Little need be said with regard to the use of the set. A little care should be taken, however, over the adjustment of the crystal and catwhisker. Search the surface of the crystal until you are sure you have found one of the most sensitive spots, after which the pressure of the catwhisker on the crystal should be varied until best results are obtained. If the aerial-earth system is good you will be surprised at the volume of sound.

H. R.

DIAPHRAGMS FOR LOUD-SPEAKERS

THOSE amateurs who have been unsuccessful in obtaining the best results from the "A.W." pleated-paper loud-speaker, owing to the use of unsuitable material for the diaphragm, should experiment with Japanese veneer.

This is an imitation of real veneer made by applying woodpulp upon a paper backing, and is largely used by fretworkers. It can be obtained from any fretwork dealer in a variety of colours. It is easily pleated and gives a very fine tone, no doubt due to the wood pulp used in its manufacture. The best to use is silver birch, this being easy to fold.

A. W. E.

MAKING A PRECISION VERNIER CONDENSER

Complete Instrument.

Introductory

TO the earnest experimenter a variable condenser of very low maximum capacity is an indispensable piece of apparatus.

Its two principal uses are for precision in tuning when used in conjunction with a larger variable condenser and for neutralising the inter-electrode capacity between grid and anode of the H.F. valve, thus making the set more stable with its use.

According to recent researches at the National Physical Laboratory, this inter-electrode capacity is about 10 micro-microfarads (one micro-microfarad is the millionth part of a microfarad) for an R-type valve plugged in an ebonite valve holder.

Small Capacity

The writer consequently decided to design and construct a condenser having a theoretical maximum capacity of about 15 micro-microfarad so that it could be used for either of the cases mentioned above.

The concentric cylinder type as shown in the photograph was preferred, since this type takes up less space on the panel than the usual semicircular plate type.

Design

Two pieces of brass tube, of different diameters, are required, the external diameter of the smaller differing from the internal diameter of the larger by about 2 mm. so as to give an air dielectric thickness of 1 mm. The condenser should then be designed to suit the dimensions of the available material.

D_1 = internal diameter of outer tube = 2.54 cm.

D_2 = external diameter of inner tube = 2.32 cm.

C = maximum capacity in micro-microfarad = 15

l = length of inner tube in cm.

Then mean plate area $S = \frac{\pi}{2}(D_1 + D^2)$ sq. cm., d the dielectric thickness = $\frac{D_1 - D_2}{2}$, and K the dielectric constant = 1 for air. Then, using the formula for parallel plate condenser,

$$C = \frac{K S \times 10^6}{4\pi d \times 9 \times 10^5} \mu\mu F$$

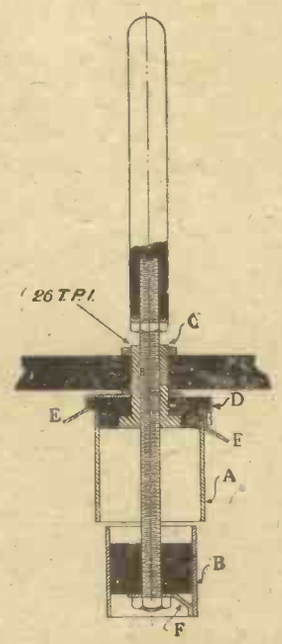
$$15 = \frac{1 \times \frac{\pi}{2}(2.54 + 2.32) \times 10 \times l}{4\pi\left(\frac{2.54 - 2.32}{2}\right) \times 9}$$

From which l = 2.42 cm.

Checking this dimension by the following formula, which is more applicable than the previous one to the case under consideration, but only when the length of the cylinder is large compared with the dielectric thickness (this is of the order of about 25 to 1).

$$C = \frac{K l \times 10^6}{2 \log_e \frac{D_1}{D_2} \times 9 \times 10^5} \mu\mu F.$$

e = 2.718, from which l = 2.45 cm.



Section of Condenser.

In the above formulæ no allowance was made for "fringe effect," that is, the distribution of electric force at the edges which is in curved lines and not normal to the plates. Hence with the length adopted, namely 2.45 cm., the actual capacity will be much higher than the theoretical capacity, 15 micro-microfarad.

Construction

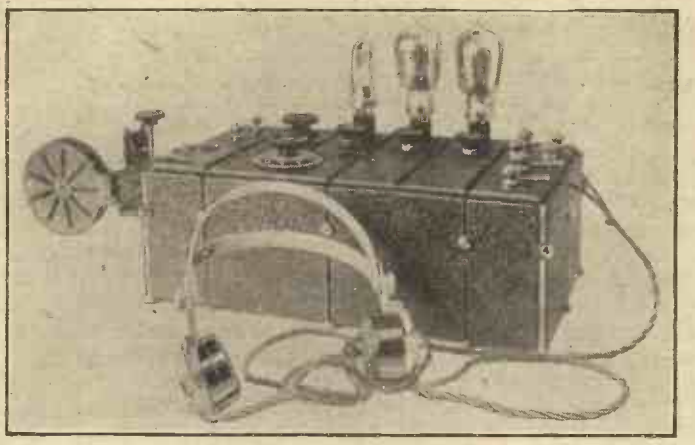
The outer tube A is cut approximately to a length of 1⅛ in. with a hack-saw, and then the ends faced up in a lathe, care being taken that the jaws of the chuck do not damage the tube. The brass bush C is then turned up to a diameter of ⅜ in. for a length of ⅞ in. and chased 26 threads per inch to suit a nut of the standard size used on the majority of one-hole fixing components. A hole (No. 22 drill) is then drilled up the centre of the bush and tapped 2 B.A. Before parting off, a flange ⅝ in. in diameter and ⅛ in. thick is turned on the bush. The disc D is roughly cut from a piece of ⅜-in. ebonite with a hack-saw and a ⅜-in. clearing hole drilled in its centre to take the bush.

The disc is now set up in the chuck by gripping the bush and turned down, for part of its thickness, to be a tight fit inside the tube A. The bush is then removed and the disc gripped by its outer edge, while the recess is turned out for the flange of the bush. By this means the bush, disc D and outer tube are made concentric with the spindle hole. Two soldering lugs E are then cut from $\frac{1}{32}$-in. brass, one fitting over the bush and secured by a thin nut, thus making electrical connection through the spindle with the inner tube B, the other being secured to the outer tube A by a 6 B.A. screw. The inner tube is then cut approximately to a length of 1 in. and then faced up in the lathe to obtain the exact length as calculated. To attach the spindle to the inner tube a piece of ½-in. ebonite is turned up to a diameter equal to the internal diameter of the tube and tapped 2 B.A. The electrical connection from the spindle to B is made by the bracket F soldered to the inside of the tube. The ebonite handle is ⅜ in. in diameter and made sufficiently long to prevent hand-capacity effects. It is drilled and tapped 2 B.A. for a length of ¾ in. for the attachment of the spindle, the spindle being of such a length that when the handle is screwed nearly on to the bush, the inner tube protrudes from the outer, giving a low minimum capacity.

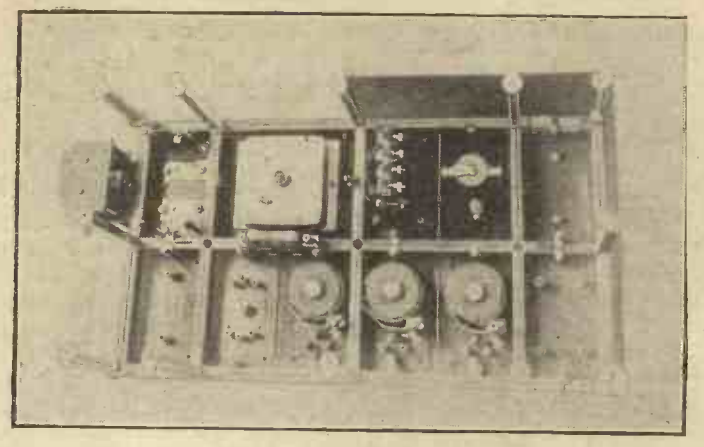
Test

When connected in parallel with a large variable condenser, weak distant signals were brought in which would have been passed over if only the main condenser had been used. On fitting it as a neutrodyne condenser the H.F. circuit, in which a Cossor P1 valve (old pattern with metal base) was used, was stabilised when about ⅜ in. of the inner tube was protruding, which shows that the calculations made were approximately correct. J. W.

The Cork Harbour Commissioners have ordered from the Marconi Co. a wireless installation for their pilot boat. The equipment will consist of a Marconi standard spark transmitter and a five-valve directional receiver.



A Finished Three-valve Set.



The Three-valve Set Partly Constructed.

THE "POLAR BLOK" SYSTEM

AMONG the ranks of wireless enthusiasts are to be found many who like to try out and test anything ranging from the latest "super" to a new type of synthetic crystal. In order to be able to carry out these tests, however, there must be available some method whereby a quick change of circuit is possible. One obvious way is the mere wiring up of the unmounted instruments, but this has the disadvantage of being extremely untidy.

A neater and far superior method, known as the Polar Blok system, has been produced by the Radio Communication Co., Ltd., of 34 and 35, Norfolk Street, Strand, London, W.C.2. All the instruments are mounted on ebonite panels of two sizes, 4 in. by 2½ in. and 4 in. by 5 in., the latter-sized panel being used for the larger components. Valve holders and rheostats are mounted together on one small panel, variable condensers occupy one of the large panels, while all the other components have small panels to themselves.

The most interesting part of the construction is the framework on which the panels are mounted. An example of the framework fitted together for a two-valve set is shown in the right-hand bottom photograph. The vertical members are aluminium castings, 5 in. high, of H-section. At the top of and cast integrally with these members are aluminium lugs, over which the horizontal members (in the form of metal tubes having a rectangular cross-section) may be pushed and automatically clipped in position. The horizontal members are supplied in three sizes, 4 in., 5 in. and 2½ in. long. Right-angled aluminium cross-pieces are also supplied, these clamping together the junctions of the horizontal members.

A frame may thus be built up to take sufficient panels for a crystal set or a one-, two-, three-, four- or five-valve receiver. The panels are attached to the framework by small brass clamping screws.

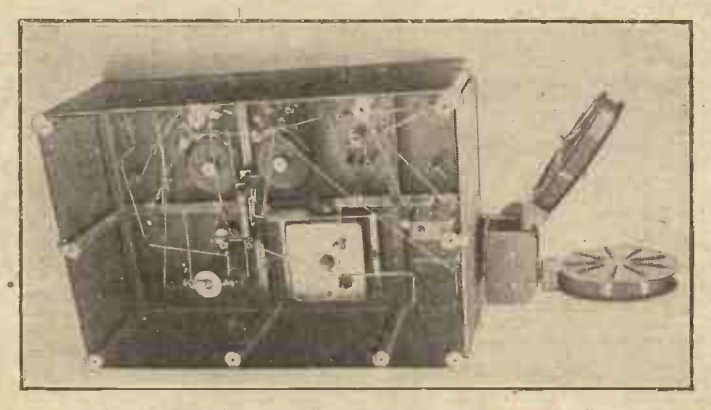
As will be seen from the photographs, a special coil-holder unit is fitted in one of the side spaces of the framework so that the coil holder overhangs the side.

In order to finish off the complete receiver, black aluminium panels (supplied in three sizes) are fitted round the sides of the framework to the uprights, thus enclosing the instruments and the wiring and preventing the intrusion of dust.

The two photographs at the top of the page on the left and right respectively show a completed three-valve receiver and the same set in the course of construction. A two-valve set comprising a detector and resistance-capacity amplifier is seen wired up in the bottom left-hand corner.

Owing to the flexibility of the circuit arrangement and layout that can be obtained with this system we have made up several sets for test and experimental purposes. The efficiency of the components is beyond reproach, and in nearly every case results were exceptionally good. For volume and purity of tone an arrangement as shown in the two top photographs is ideal. A detector valve with reaction is followed by one stage of transformer and a further stage of resistance capacity-coupled low-frequency amplification; a series-parallel switch is employed for the reception of short and long waves. Even greater purity at the sacrifice of a little signal strength will be obtained by changing the L.F. transformer for another resistance-capacity unit.

The National Telephone Company of Spain has offered to the Government of that country the use of the telephone system for the distribution of broadcast programmes.



Photograph showing the Wiring of a Two-valve Set.

The Framework of the Two-valve Set.

SUMMER-TIME EXPERIMENTING

THE glorious weather we have been enjoying tempts the experimenter out of doors away from his wireless set, but it is with a certain amount of reluctance, because many have got so used to experimenting that they feel lost without it. There is, however, much that the amateur can do out of doors and still feel that he is not neglecting his hobby.

Earth and Lead-in

He knows, for instance, that his lead-in should not run close to the wall of the house, and will have guarded against this as far as possible. It is, however, interesting and instructive to discover whether there is any appreciable capacity effect taking place. The dial readings of the condensers should be noted carefully, the set taken into the garden and the aerial and earth disconnected from the lead-in tubes and taken direct to the set. It will generally be possible, under these conditions, to increase the distance between the down-lead and the wall, and although no increase in signal strength may be detected the aerial condenser setting will give an indication of whether there is any considerable capacity effect when the set is used indoors. In making this test, and in others described later, the reaction coupling should remain unaltered, otherwise the condenser readings will be affected.

A Crystal Experiment

It has often been stated that a crystal can be made more sensitive by focusing the light of the sun on it. The present weather enables crystal users to carry out interesting experiments based on this theory. Little is known of the action which takes place when a crystal is rectifying, but it has been suggested by some that a minute arc exists between the crystal and cat-whisker. If such is the case the result would be a very high temperature, and it is possible that by increasing this temperature the sensitivity of the crystal is increased. Or it may be that the crystal rectifies better when the whole of it is heated.

It is suggested that the lens should be mounted on a small stand so that the beam of light may be kept steady and concentrated on any desired portion of the crystal. The difference, if any, should be noted when the heat is concentrated on the point of contact only as compared with the whole crystal, and the experimenter should attempt to discover whether the effect is temporary or permanent.

Aerial Comparisons

Another source of experiment, for both crystal and valve user, is with the length of aerial and its effect on signal strength and selectivity.

It is suggested that a length of bare wire be used as an experimental aerial, erected as high as possible at one end and brought down to the set, which should be placed on a light table which can be moved easily. A portable earth connection should also be prepared, as the use of the ordinary one would result in an alteration in length of the connecting wire each time the set was moved and the tuning affected. A few feet of wire can be twisted round a poker which can be pushed into the ground alongside the table each time it is moved, and it should be inserted to the same depth in similar soil every time, if possible, so that the conditions may be the same.

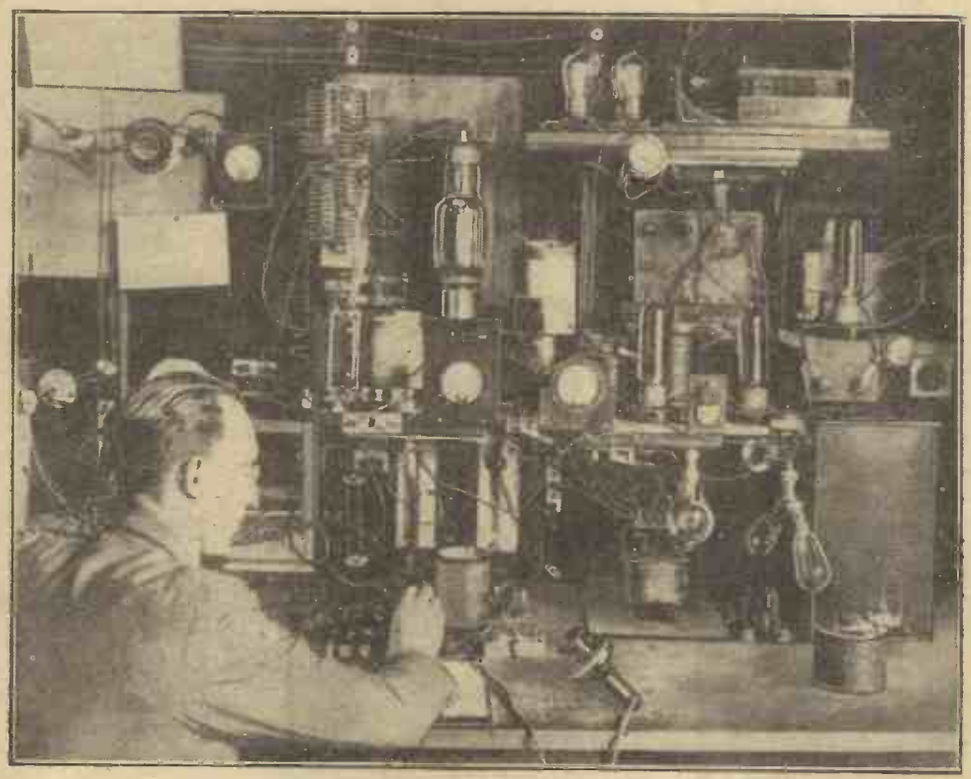
Commencing with the full length of the aerial, the scale readings should be carefully noted and the degree of selectivity determined by noting the movement necessary on either side of the optimum point to reduce signal strength. The table should now be moved so as to shorten the aerial by a few feet and the slack wire made into a small coil and bound tightly with a piece of wire so as short the turns. The scale readings should again be recorded and the process repeated as many times as possible. As mentioned above, reaction coupling, filament temperature, H T., etc., should remain constant, and if a crystal is used an endeavour should be made to carry out the tests without resetting the contact.

A simple calculation, based on the degrees of movement on a condenser, or the number of turns on a tapped coil, as compared with the alteration in length of the aerial, is extremely interesting and instructive, whilst the user can also gain valuable knowledge as to the best length of aerial for obtaining selectivity without loss of signal strength.

Interference

Another interesting source of experiment with the temporary aerial, if the user has two receivers, is to discover the extent to which tuning one set will affect the other. Incidentally, it is quite possible that some valve users who carry out these experiments will discover that there is one more oscillator of which they were not previously aware.

There may be other experiments which will occur to the reader, but it is hoped that these notes will show that wireless can be as interesting during the summer as in the winter, still permitting the enjoyment of being out of doors. R. H. B.



AN ENTHUSIASTIC AUSTRALIAN AMATEUR

Mr. Maclurgan (2 C M), of Sydney, Australia, who has been in communication with England during daylight on a wavelength of 20 metres. The photograph shows the 50-watt valve transmitter.

DAVENTRY

can be heard best on

B.T.H. RADIO

Apparatus

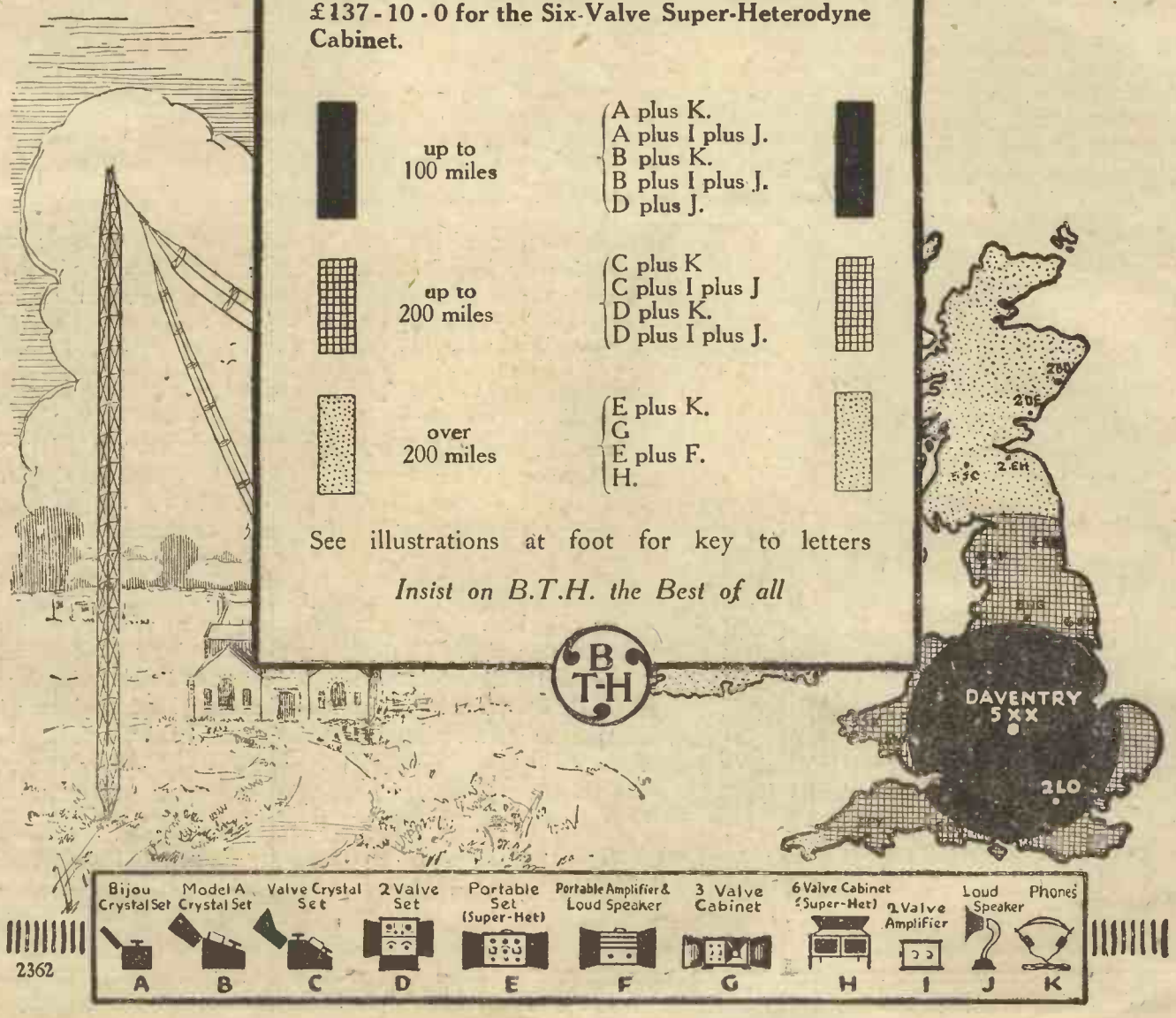
If you want to hear Daventry as well as it can be heard, buy B.T.H. Radio Apparatus. Your local dealer will be glad to demonstrate that any one of the receivers, or combinations of apparatus, scheduled below will do what we claim for it. He will also give you details of prices, which range from 35/- for the "Bijou" Crystal Set to £137 - 10 - 0 for the Six-Valve Super-Heterodyne Cabinet.

up to 100 miles	A plus K. A plus I plus J. B plus K. B plus I plus J. D plus J.
up to 200 miles	C plus K C plus I plus J D plus K. D plus I plus J.
over 200 miles	E plus K. G E plus F. H.

See illustrations at foot for key to letters

Insist on B.T.H. the Best of all

B T-H



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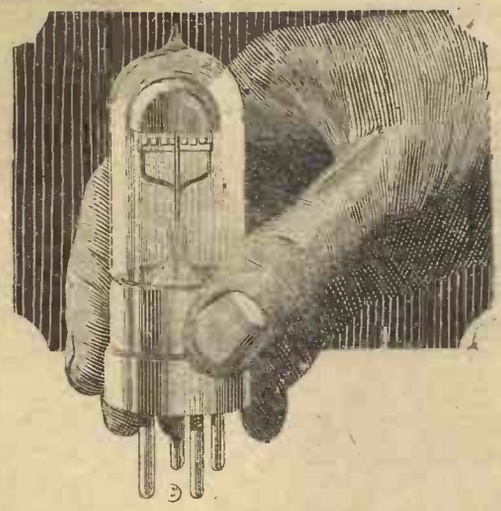
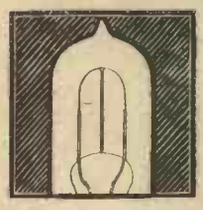


Wuncell advantages:

No. 4



THE arched filament of the Wuncell Valve is further strengthened by means of a special centre support. Thus all possibility of sagging—no matter in which position the Valve is used—is entirely eliminated.

The Wuncell filament is not held under tension; therefore, it is not subjected to any strain when the current is suddenly switched on or off.

Obviously this three point method of construction is very largely responsible for the long life of the Wuncell Valve.

Technical Data:

Filament voltage, 1.2 to 1.8
Fil. consumption, .3 amps.
Plate voltage, 20 to 80

Prices:

W.1 For Detector or L.F. Amplifier.

W.2 (With red top) for long distance reception.

14/- each

*W.R.1 Corresponding to W.1.

*W.R.2 Corresponding to W.2.

16/- each

**Fitted with internal resistance so that Valves can be used with 2-, 4-, or 6-volt Accumulator without alteration to Set.*

PERFORMANCE —the acid test for a Valve

THE first Dull Emitter placed on the market was not a Cossor—but Cossors had been experimenting with Dull Emitters long before. Obviously Cossor's reputation for Bright Valves is such that they cannot afford to trifle with any Valve which will not at least equal in efficiency the wonderfully popular P.1 and P.2 Cossor Valves.

* * * * * *

Previous to the introduction of the Wuncell Valve there was not a Dull Emitter that could be said to compare with the high average standard of a British Bright Emitter. If it had volume it lacked sensitiveness. If it possessed tonal purity it suffered from microphonic noises. And so on. There was always some defect that wireless enthusiasts were glad to put up with to overcome the continual heavy upkeep costs of 4-volt Valves consuming nearly ¾ of an ampere.

* * * * * *

But the Wuncell is quickly changing everyone's ideas as to what a Dull Emitter can and should do. Users are finding that they sacrifice nothing when they change over to Wuncells. Rather, indeed, do they gain heavily.

* * * * * *

In volume, sensitiveness, freedom from microphonic noises, exceptionally long life, low operating cost, purity of tone and stability the Wuncell is indeed without equal. And whether their Set is a reflex or a plain Circuit—a single valve or a multi-valve —they are finding that Wuncells give it added sensitiveness.

* * * * * *

Remember that the Wuncell requires less then 2 volts and it consumes only .3 ampere—its low current consumption is obtained by means of a special filament (exclusive to the Wuncell) and not by means of a filament whittled down to the point of fragility.

* * * * * *

After all, there is not much economy in obtaining low current consumption if the filament is made excessively delicate and the life of the Valve endangered. If you want long service for your Dull Emitter, use the Wuncell—the only Dull Emitter with a filament as stout and as robust as that used in an ordinary bright valve.

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

Cossor Wuncell Valves

THE BRITISH DULL EMITTER WITH THE LONGEST LIFE

On Your Wavelength!

"Cheap" Components

I SEE both from the papers and from the windows of certain wireless shops that wholesale dumping of foreign-made wireless goods has been taking place recently. Now, I am not going to say that there are no foreign-made components that are any good at all. There are a few of these low-priced articles which can and do give fairly satisfactory results. On the whole, however, I would strongly recommend my readers not to be led away by the lure of mere cheapness. The soundest piece of advice that one can give as regards the purchasing of wireless goods is this: Always buy the best that you can afford, and never waste your money on dirt-cheap stuff.

A great many of these foreign-made components are brought to me at one time or another by friends who have used them in making up sets and cannot discover why they get such poor results. Let me give you a few experiences with them. I have seen nameless condensers with a stated capacity of .001 microfarad whose actual capacity was .00000 microfarad because the maker had omitted to connect the terminals to anything within the moulded ebonite case. One pair of telephones stamped 2,000 ohms had actually a resistance less than one-tenth of that amount, and they were so insensitive that only the loudest and strongest signal produced anything like audible results when they were used with a crystal set. Many of the cheaply made low-frequency transformers contain so little wire in their primary windings that they are practically useless for wireless purposes. Cheap rheostats are frequently made with a former of some material, certainly not ebonite, which has hardly any insulating properties at all. Further, the resistance of their spirals may be so low that they are almost useless for regulating valve potentials, and contact arms are often so fixed that they are found to work loose almost as soon as the rheostat is put to work. I give this warning, not because I have any prejudice against foreign-made components as such, but because I hope by doing so to save readers from spending money upon useless goods, which they will only have to replace after a short period of use.

Another Point

Another point which should be borne in mind is that our own wireless trade is an important one, employing a very large number of workpeople. By buying British goods we are not only sure of obtaining satisfactory components which will work well in the receiving set, but we also have the comfortable knowledge that we are giving employment to our own factories.

Whilst I am on the subject of foreign components, there are just two other things that I would like to bring to your notice. Do not forget that foreign valves, particularly those used in America, are very different from our own. High-frequency components made abroad are designed for use with valves that are practically unobtainable in this country.

Foreign H.T. Batteries

Lastly, if you take my advice you will sternly reject any foreign high-tension battery of cheap make that is offered to you. I have had some experience of these things, and I can assure you that I would not touch one of them with the end of a very long pole. As a rule they are simply thrown together. The insulation is unsatisfactory, the cells are too small, whilst the depolariser is so poor that continual fluctuations of current and potential take place when the battery is connected up even to a small set. This means that almost as soon as it is put into use the battery becomes noisy and that reception, whether by phones or loud-speaker, is of that unpleasant type in which speech and music are heard imperfectly above a background of fizzes and crackles. The purchasers of such batteries are always complaining about atmospherics, though other people in the same neighbourhood do not notice their effects. I have tested two of these batteries recently. The first, which had a nominal E.M.F. of 66 volts, showed 23 after three weeks' use on a single-valve set, whilst the second went completely to pieces in less than a month on a two-valver fitted with general-purpose valves. Really I think that a cheap high-tension battery is in the end about the most expensive component that one can buy.

The New Big Station

The new high-power station at Daventry is due for opening at the end of the month, and probably before this note appears in print some readers will have been picking up test transmissions. I have not done so myself so far, probably because I very seldom use the long waves just now owing to certain interferences which rather spoil one's pleasure in reception. I am very much wondering how the new position for the high-power station is going to pan out. I expect that there will be quite a wail from crystalites in the south of England, who have hitherto been enjoying first-rate reception from 5XX, but may find that they get nothing like the same results from Daventry owing to the far greater distance between his aerial and theirs. There is, I see, talk of erecting a second high-power station somewhere south of London to cater for the great crystal demand in the south. It may be a little difficult to find a free wavelength anywhere between 1,500 and 2,000 metres, but possibly this may be overcome. I only hope, though, that if there is to be a new high-power station, its wavelength will be as far away as possible from both Daventry and the 1,750 metres of Radio-Paris.

Short-wave Broadcasting

The International Wireless Council at Geneva is having its work cut out in attempting to settle the vexed question of wavelengths for European stations. At present there are great numbers transmitting on wavelengths between 300 and 500 metres, and twenty or thirty new ones are contemplated, some of them, I believe, already in course of construction. With a sensitive set you have only to wander up slowly from the 300-metre mark with the aid of a wavemeter on any good evening to realise how great the crowding is at the present time. Quite a lot of "wangling" of normal wavelengths has to be done by our own stations to avoid heterodynes; usually the process is successful, but not infrequently one does find a continuous whistle accompanying the transmission of some main station.

It has been suggested that more broadcasting should take place on a waveband lying upon either side of 200 metres. There is much to recommend this idea, for apparently the shorter the wavelength, the less affected it is by seasonal conditions and the more immune from atmospheric interference. There is the further point that the shorter waves seem to carry amazingly well over long distances. There are, however, one or two drawbacks to the use of short waves. Unless a set is very carefully designed to avoid all stray capacities and couplings, it becomes increasingly unstable and more difficult to handle as the wavelength to which it is tuned is reduced. Not a few broadcast receivers would, I think, have difficulty in dealing with waves in the neighbourhood of 200 metres. Rather more skill is required in tuning on the short wavelengths, and it is possible that interference due to radiation from oscillating sets might be rather fierce. It seems quite certain, though, that something will have to be done to straighten out the present rather chaotic condition of European broadcasting, and perhaps we shall find salvation in the use of the shorter waves.

Valve Savers

I wonder if there is any wireless man

On Your Wavelength! (continued)

who can lay his hand upon his heart and declare that he has never in the whole course of his career burnt out a valve either by endeavouring to insert it wrongly into its holder or by connecting in a moment of madness the H.T. leads to the L.T. terminals of his set? All kinds of devices have been brought out for the safeguarding of valves, and many of them are most useful if they are properly used. One of the best when general-purpose valves are employed is to place an ordinary pocket flashlamp bulb at the junction between H.T. and the low-tension lead, positive or negative as the case may be, to which it is connected. If this is done, the filament of the flashlamp—it should be of the 3-volt type—will go before those of the valves should a misconnection be made.

This safeguard, however, is of no use in the case of dull-emitters, for the current required to make the lamp "blow" is much more than sufficient to wreck their filaments. A common method when dull-emitters are used on the receiving set is to use a high resistance in one of the high-tension leads which will prevent more than a few milliamperes of current from passing even if a high-tension short takes place. It must, however, be remembered that resistances have curious effects when placed in the plate circuits of valves, and it is therefore necessary, if one is used as a safety device, to shunt it with a large condenser. If this is not done some curious effects may be observed. Still another method, which I use myself, is to fit tags of different kinds to the various high- and low-tension leads and to provide on the set terminals which will fit only the tags of their proper leads. If one does this, and makes a point of switching off the high-tension supply before inserting a valve into its holder, one is pretty safe from trouble.

Know Your Valves

The advice to try each general-purpose valve in different parts of the set so as to discover where it works best has often been given, but somehow it seems to be neglected by a large number of wireless enthusiasts. The processes of valve manufacture are now so standardised that individual valves of the same kind differ as a rule but slightly from one another. Still, if one takes the curves of three or four valves of the same batch there are nearly always tiny differences between them. In actual use on the set these small variations of character may be sufficient to make one valve work best as high-frequency amplifier, another as rectifier and a third as note magnifier.

I had an example of this the other day when a friend brought round a three-valver which he found very difficult to control. On test it was found that he had not exaggerated his account of its waywardness. I tried changing the valves over—all were of the same kind—and found that the one which he had been using as high-frequency amplifier was for some reason not suited to that position. By placing it in the rectifier holder and making the erstwhile rectifier do duty in its stead, the performances of the set were greatly improved and it became very much more easy to handle.

This is rather an exceptional case, since most general-purpose valves do pretty well as high-frequency amplifiers. As a rule it is the note magnifiers that may give the trouble, and if you are not satisfied with the quality of your reception, you should always try whether valves from other parts of the set will not work better in the low-frequency holders. Certain valves, too, seem to be born rectifiers, so to speak, doing far better in this position than in any other. A really good rectifier makes an enormous difference to the performances of any receiving set.

Doubts

For a good many years now I have been an advocate of what I call sane high-frequency amplification. By this I mean some form of intervalve coupling which can be properly controlled so that the set does not burst into oscillation if you come within a yard of it. The difficulty, however, is to obtain a type of high-frequency coupling which satisfies these requirements and is at the same time fairly efficient. There should, I think, be a distinction between the set used for the reception of morse signals and that employed for telephony. If you wish to be able to tune in the C.W. transmissions of European and American amateurs the ideal set for the purpose is one with knife-sharp tuning which will oscillate readily. On the other hand, should you wish to obtain really first-rate reception of telephony, it seems to me that the set should not be over-selective, and certainly it should be nowhere near the oscillating point when a transmission is being received. Now, if you use two stages of aperiodic high-frequency coupling without reaction you achieve very much the same strength as is obtainable with reaction and without H.F. valves.

For telephony I think that this is the better method on the whole, though the transformers require careful spacing to avoid interaction, and a certain amount of mush is usually brought in when high-frequency amplification is used. But reaction again brings in mush, and if extensive use is made of it to neutralise damping it makes the set so sensitive that the tiny atmospherics which are always with us, though in the ordinary way we do not notice them, are made audible in the receivers in the form of hissing and rustling noises. The only way to settle doubts of this kind is to make up two exactly similar sets, one with high frequency and without reaction, and the other with reaction but without high frequency. This I am doing at the present time, and I look forward to a most interesting period of experimenting.

Earth Noises

In some localities what are known as earth noises may be very troublesome. These may be due to a form of interference from trams, lighting mains, power cables and so on where an earth return is used. Some time ago I was a victim to them, and I found considerable relief by making use of a counterpoise instead of the usual earth connection. Any reader who wonders whether his own set will do better with a counterpoise should try a simple experiment before he goes to the trouble and expense of rigging one up. Take a hank of insulated wire—any wire will do, though the thicker it is the better, and flex is the handiest—and throw it loosely on the floor of the room in which the receiving set is situated. Bare one end and attach it to the earth terminal of the set instead of the usual earth wire. You will have most probably to increase the setting of the A.T.C. owing to the smaller capacity that there is now in the collector system.

Often it will be found that signal strength is not reduced, that tuning is distinctly sharper, and that extraneous noises, if not altogether absent, are much less troublesome than they were. In this case we may pretty safely assume that if you rig up an outdoor counterpoise it will give you better results than the original earth connection. If, however, you notice no improvement, then it is probably not worth while to bother farther about the counterpoise. The coil of wire tip, by the way, is a very useful one if you are trying out a set in some house where it is difficult to obtain an earth connection.

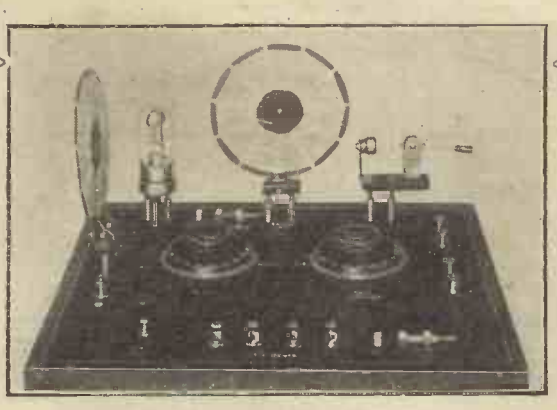
Novelty at Belfast and Edinburgh

To-morrow night a rarely-heard work will be broadcast from Belfast, namely, Granville Bantock's melody *Hamabdil*. It comes in the half-hour to be devoted to Hebrew music, and will be played by Mr. Reginald Dobson ('cello) and Miss Pauline Barker (harp).

On Sunday, too, community singing will be tried at Edinburgh. Sir Walford Davies is going to conduct, and the event should prove interesting. Edinburgh, too, is to have a visit to-morrow afternoon from the Danish Students Singers' Union. Their choir goes to Iceland next month, with students from the University of Copenhagen, and they make a halt at Edinburgh to-morrow. Now, is that what they call "trying it on the dog," or a compliment?

THERMION.

A DOUBLE-PURPOSE CRYSTAL-VALVE SET



Panel of Crystal-valve Receiver.

THE set about to be described has, at a distance of about seven miles from 2 L O, operated a Junior Amplion loud-speaker with the utmost satisfaction. The loud-speaker could be heard easily in the next room. Other special features are the simplicity of wiring (as will be seen by the wiring photograph and diagram) and the unique means employed for changing over from crystal to valve.

A list of the necessary components is appended, and the actual makes used by the writer are shown in brackets.

Panel, 12 in. by 10 in. by ¼ in. (Paragon); cabinet, 5 in. deep (Peto-Scott); one square-law or ordinary variable condenser .0005 microfarad (A. J. S.); one square-law or ordinary variable condenser .0003 microfarad (A. J. S.); one fixed condenser .001 microfarad (Edison Bell); one fixed condenser .0002 microfarad (Edison Bell); one low-frequency transformer (Radio Instruments); one rheostat (Microstat); four small telephone terminals; six small pillar terminals; one valve holder; six valve sockets for coils and detector; six valve pins; two small panel-mounting switches, S.P.D.T.; transfers (Nugraving); 2 oz. No. 24 d.c.c. wire; 2 oz. No. 28 d.c.c. wire; two basket-coil formers 4½-in. and 5-in. diameter; detector; screws; wire, etc.

A Cossor P1 valve was found to give excellent results.

Reference to Fig. 1 will furnish all necessary details for drilling the panel. Attention is drawn to the fact that the holes shown for the transformer may not be suitable for any make other than the R.I., also those for the variable condensers are the centres. In some makes of square-law condenser the moving vanes are not mounted centrally. If drilled as shown, the holes may not exactly fit the components to hand. All holes for terminals and valve sockets should be tapped.

After drilling the panel, the next step is that of marking it with the transfers. It is necessary to do this now because if left until later on the various terminals, etc., will be in the way. The first photograph and Fig. 2 show where to place the transfers.

Assembly

The components, terminals, etc., are now secured to the panel and everything is in readiness for the actual wiring to be commenced. It is not a bad plan to use terminals for the H.T. and plugs and sockets for the L.T. This affords a safeguard against accidentally burning out a valve owing to the H.T. battery and accumulator being connected to the wrong terminals on the set. Fig. 3 shows the wiring of the back of the panel and the circuit diagram is shown by Fig. 4.

The detector is shown by Figs. 5 and 6.

First a small piece of ebonite 2¼ in. by ¾ in. by ¼ in. with the corners nicely rounded off is drilled with three holes (4 B.A. clearance) as shown. To mount the crystal cup a thin piece of strip brass 1¾ in. long by about ½ in. wide is bent at right angles 1¼ in. by ½ in. On the long side a small hole is drilled near the top and another in the centre of the short side. The former should be so drilled as to allow the top of the cup when secured to come just flush with the top of the strip. This is now mounted on the ebonite by means of a valve pin inserted through the hole in the ebonite 31/32 in. from the centre hole. Next in a piece of thin strip brass 1 in. long two small holes (4 B.A. clearance) ¾ in. apart are drilled. Now secure the upright carrying the detector arm on the top of the ebonite and the strip just mentioned to the under side with a small screw and nut passed through the hole ¾ in. from the centre. A valve pin is now inserted in the other hole on the strip and through the remaining hole on the ebonite.

The coils are of the basket-type wound on 4½-in. and 5-in. formers, each having eleven slots and 1½-in. diameter centres. Eighty turns of No. 28 d.c.c. wire on the larger former provides the aerial coil and fifty-five turns of No. 24 d.c.c. wire on the smaller former the anode coil.

Fig. 7 shows the construction of the coil holders. A small piece of ebonite 1½ in. by ½ in. by ¼ in. is drilled with two holes ¾ in. apart and a small hole on the narrow side to take a 6 B.A. screw, which

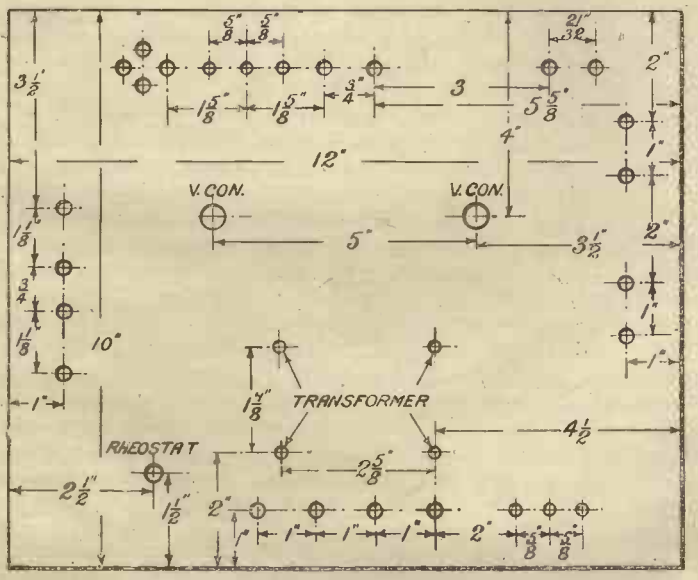


Fig. 1.—Drilling Plan of Panel.

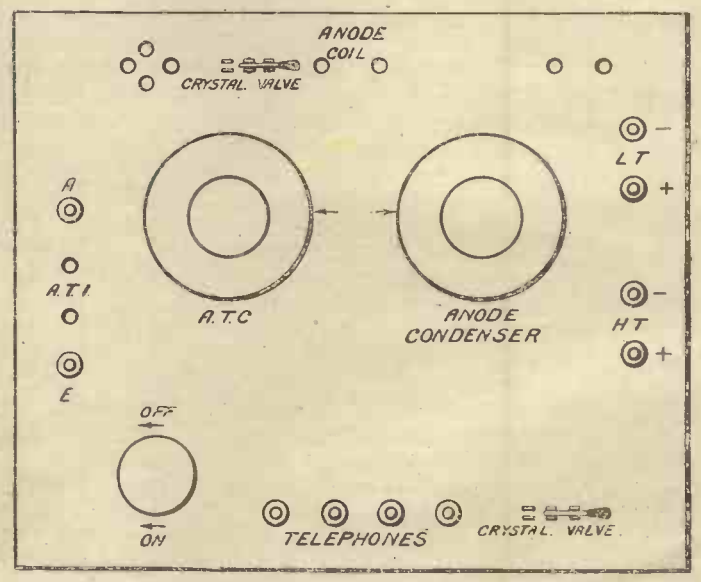


Fig. 2.—Layout of Panel.

in turn will be used to grip the upright holding the coil. The valve pins are now made fast in the first-mentioned holes, and the upright, consisting of a strip of ebonite 4 in. by ½ in. by ⅛ in. or a little thicker with two holes drilled in it, one at each end, is then secured with the screw. The coil itself is fastened to the upright with a small screw and nut through the centre of the coil former and through the hole at the top of the strip. The two wire ends are bared, given one or two turns round the valve pins just under the ebonite, and then fixed with a spot of solder.

Operation

The set is now ready for use. First of all try the crystal circuit. Place both switches over to the left and put the detector in the grid and anode sockets of the valve holder. Insert the aerial coil in the sockets between the aerial and earth terminals and slowly turn the aerial tuning condenser. Having tried the crystal circuit, now change over to the valve, the circuit of which is a reflex or dual. First remove the detector and place it in the two sockets on the extreme right and throw both switches over to the right. Now insert the larger coil in the sockets between aerial and earth and the smaller one in the sockets in the centre of the panel at the back. Connect up the high- and low-tension batteries to their respective terminals. About 80 volts is necessary for H.T. The two condensers are now slowly turned until the local station comes in at good strength. It may be necessary to place a fixed condenser across the terminals of the loud-speaker.

Wave Trap

A wave trap consisting of sixty turns of No. 26 d.c.c. wire wound on a 3-in. cardboard inductance tube with a .001 variable condenser across it (see Fig. 8) was used in conjunction with a 100-turn basket coil for the A.T.I. and an 80-turn coil of the same gauge wire in the anode sockets brought in Aberdeen, Glasgow and Birmingham at good strength whilst the local station was working. Continental stations also come in well.

A. H. W.

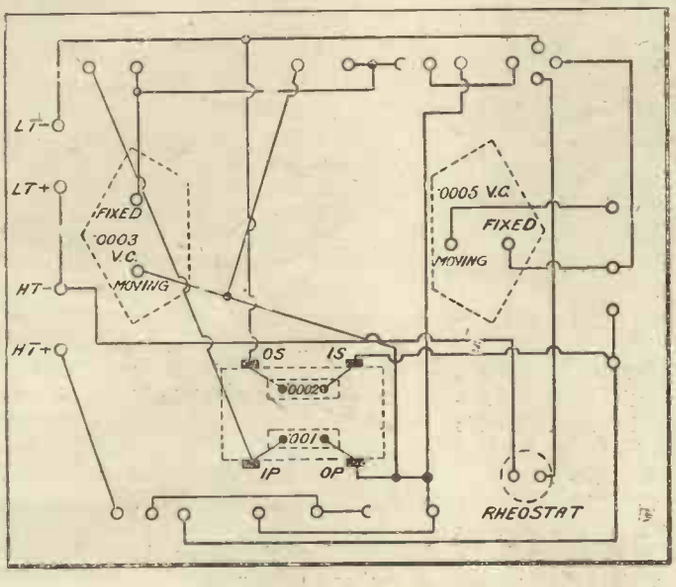


Fig. 3 (above).—Wiring Diagram of Back of Panel.

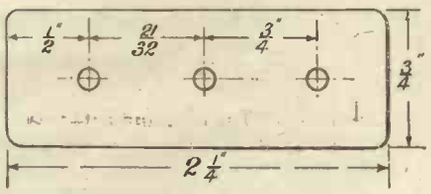


Fig. 5 (left).—Detector Base.

Fig. 7 (right).—Coil Holder.

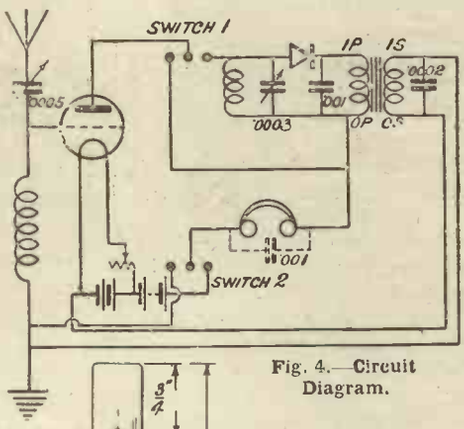


Fig. 4.—Circuit Diagram.

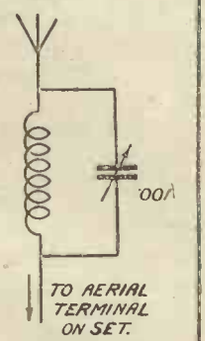


Fig. 8.—Wave-trap Circuit

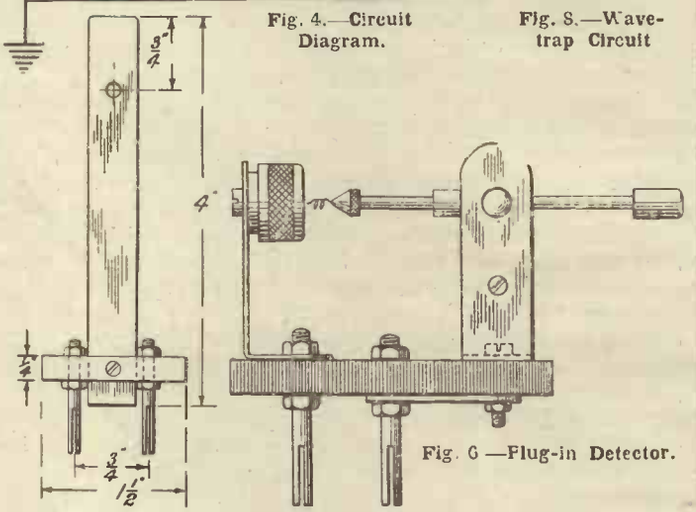


Fig. 6.—Plug-in Detector.

AN INGENIOUS VALVE RELAY

THE impact of electrons against the anode of a valve invariably gives rise to a certain amount of heat, which in turn results in a certain expansion of the metal electrode. This electron bombardment, which in the case of a transmitting valve is sufficient to raise the anode temperature to a white heat, can be utilised to close a contact mounted inside the glass bulb, thereby causing a local circuit to sound an alarm in the case of a calling-up device, or to actuate some piece of mechanism in the case of distant-control apparatus.

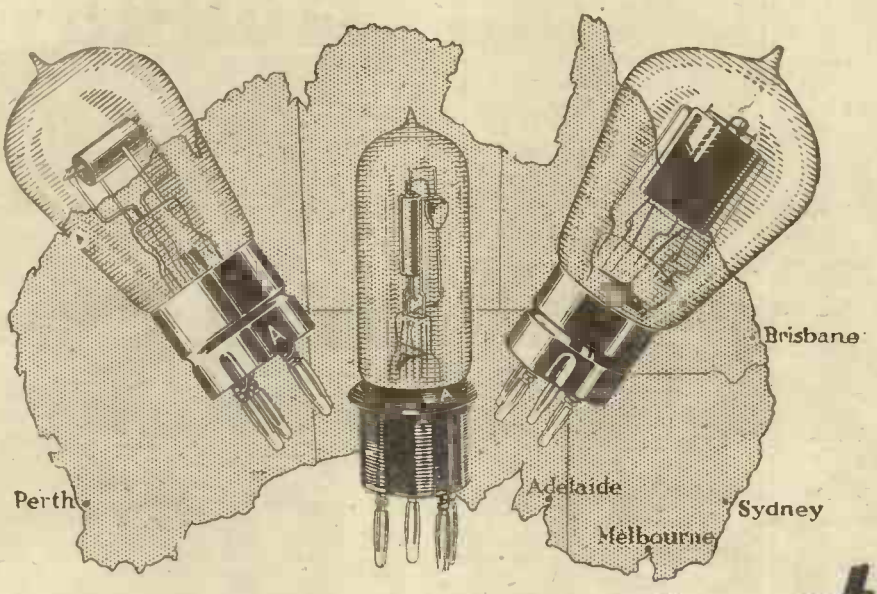
The anode is made in the form of a thin ribbon, one end of which is connected to a lever so as to magnify the expansion effect. An incoming signal impulse applied to the grid increases the electron current through the valve, and the resulting impact of electrons against the ribbon anode heats the latter, causing the attached lever to swing over and close an alarm or power circuit. The lever and contact are both located inside the glass bulb. In order to increase the sensitivity of the arrangement the ribbon forming the anode is preferably maintained at a given critical temperature by passing a separate electric current through it.

B. A.

SELECTIVITY AND A GOOD EARTH

IT is useless to expect a high degree of selectivity from any set that is not properly earthed. A poor earth means high resistance, and this in turn means damping of the aerial circuit and broad tuning. Resistance is inimical to resonance; in fact it is sometimes deliberately introduced to prevent self-oscillation caused by the interaction of two sharply-tuned circuits. A bundle of old (but not rusty) wire-netting makes one of the best earths it is possible to get.

M. A. L.



Australia on a Dull Emitter!

MR. W. K. ALFORD (G2.DX), the well-known radio amateur, has established a new wireless record by communicating with Sydney, N.S.W., using a ***low-power Dull Emitter valve*** for transmission.

The valve was one of the range backed by the names **MARCONI and OSRAM** and was ***the first Dull Emitter to be used for long-distance communication.***

This record again proves the efficiency and economy of this comprehensive range of Dull Emitter valves.

PROFIT BY THE EXPERIENCE OF THOSE WHO KNOW

CHOOSE YOUR DULL EMITTER VALVES FROM THIS RANGE

FOR 2-VOLT BATTERIES:		
D.E.R.	General Purpose	14/-
D.E.6.	L.F. Amplifier	18/6
FOR 4-VOLT BATTERIES:		
D.E.Q.	Detector	27/6
D.E.3.	General Purpose	16/6
D.E.3.B.	L.F. Amplifier (For resistance capacity)	16/6
D.E.4.	L.F. Amplifier	22/6
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D.E.5.	L.F. Amplifier	22/6
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Buy the Valves backed by the names

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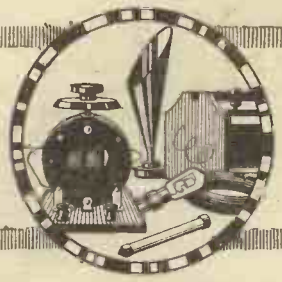
Wireless on Your Holidays!



PRACTICAL ODDS AND ENDS

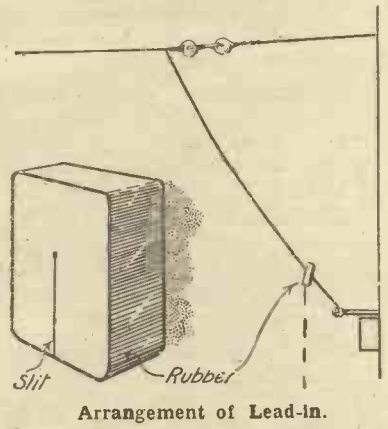
Applying Panel Transfers

THE following tip may prove useful in applying panel transfers where it is either inconvenient or undesirable to use the normal "hot pad" method.

Cut out and strip the thick paper backing from the required transfers. Have ready a saucer containing methylated spirit. Dip the transfer into the spirit and place in position on the panel, pressing it firmly down with a pad slightly damped with spirit. Leave it to dry (this takes only a few minutes), and then wash off the transfer in the usual way with a wet sponge. A. W. E.

Protecting the Aerial

LEAKAGE from an aerial is often caused by rain finding its way down to the lead-in tube and making a comparatively low-resistance path for the aerial currents.



Arrangement of Lead-in.

This can easily be prevented by drilling a small rubber block (an ordinary pencil eraser is very suitable) and threading it over the lead-in wire. Raindrops, which would tend to collect and run down the lead-in tube are thus checked, and drip off the block without doing harm. The hole in the rubber must, of course, fit tightly over the wire or the water may run through. The block may be firmly fixed in position with tyre solution or by any other convenient way. R.

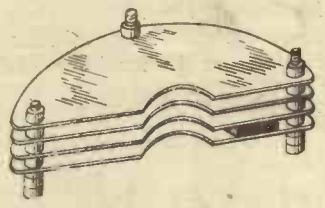
Corroded Terminals

ACCUMULATOR acid, if allowed to creep over the edges of the vent holes on to the terminals, may cause crackling noises in the phones or loud-speaker owing to the imperfect contact at the joint.

To prevent this, vaseline or petroleum jelly should be liberally applied to the metal parts on the top of the accumulator. E. M. E.

A Stop for Condenser Vanes

AN efficient stop to limit the movement of condenser vanes can easily be made as shown in the accompanying diagram. A small block of ebonite is filed



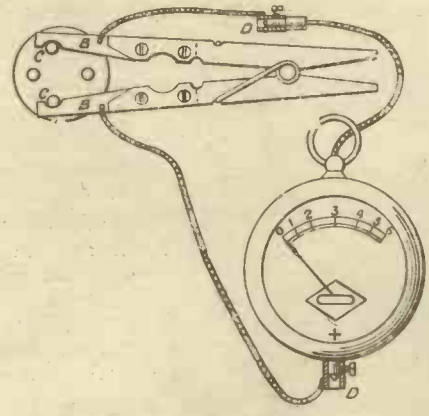
Stop for Condenser Vanes.

down thin enough to fit the space between the last two plates, and may be held in position by means of a small flat-headed screw passed upwards through the bottom plate.

Alternatively, if the condenser plates can be taken apart, a countersink screw and nut may be used to hold the block in position. The bottom moving plate is cut away slightly to bring the edges of the two sets of plates parallel to each other when in the minimum position. J. I. D.

Testing Filament Voltages

IN order that the filament may not be overloaded, occasional measurements should be made of the voltage drop across



Testing Filament Voltage.

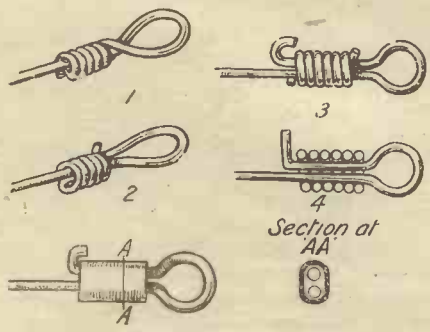
the valve legs. This can be done by pressing the voltmeter connections on to the filament legs, but this is unreliable, since the contact is usually poor and there is a danger of touching the plate leg, with disastrous results.

The device illustrated may be used for battery testing. A clothes peg of the clip type has two slots an inch deep and of width equal in thickness to a hack-saw blade cut in its ends. Two pieces of brass B are cut out and drilled as shown, the semicircular recesses C being made to fit on the valve legs. These brass contact fingers are secured in the slots by small brass screws. A piece of flex about a foot long is soldered on to each contact finger, the other ends of the flex being soldered to the sleeve terminals D to make suitable connections to the voltmeter. J. W.

Making Loop Wires

THERE are several methods of making loops in the ends of galvanised-iron wire tracings other than the obvious one of twisting up the wire round the main strand as sketched in the figure (1).

The arrangement shown below (2) is quite a sound one and is easily formed with



Making Loop Wires.

two pairs of pliers, one of which is a strong pair of the round-nosed type. It is a modification of the aeroplane scheme illustrated in sketch No. 3. Here the wire is looped and the free end turned back into a sort of a hook. This end should not be hooked up at the outset, but simply bent at right-angles as in sketch No. 4. The parallel wires are then bound with wire of the same or only very slightly smaller gauge than the main wire.

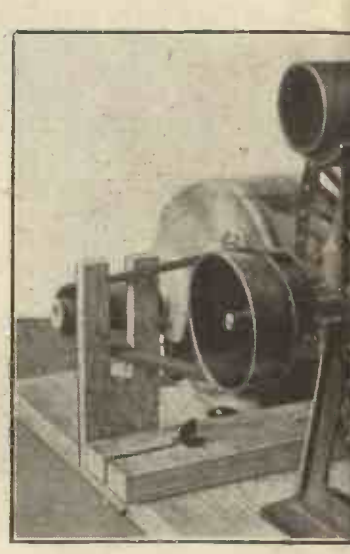
Another method is to fit a piece of flattened brass or copper tube round the parallel wires and then to hook over the free end as in the bottom sketches. H. G.

Example of Transmitted Photograph.

HAS TELEVISI

TELEVISION as a laboratory experiment has been accomplished! Is it too much then to expect that within a few years a convenient

A Special Article by



The Transmitter of the Je

THE electrical transmission of pictures and television can be conveniently divided into two parts: these are (1) by the use of connecting wires and (2) by wireless. Both schemes and both systems had their beginnings when Berzelius discovered selenium in 1817. This metal occurs free in some specimens of native sulphur and in combination, when it often takes the place of a small part of the sulphur in pyrites (FeS_2). It is also found free in the dust-flues of the pyrites burners of sulphuric acid works.

Now you may or may not know it, but selenium possesses the curious property of conducting an electric current better when it is in the light than when it is in the dark. To do this to the best advantage the semi-metallic kind that is obtained by slowly cooling melted selenium must be used. It is then mounted in a holder which has wires secured to it so that it can be connected in an electric circuit. It is then known as a *selenium cell*.

Shelford Bidwell, of England, invented,

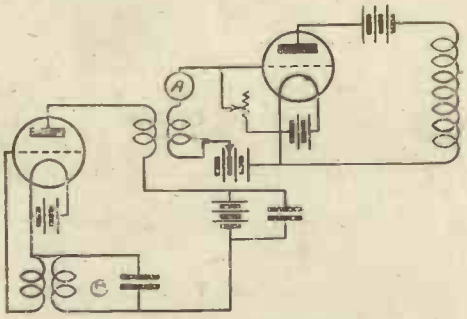


Fig. 3.—A Television Circuit.

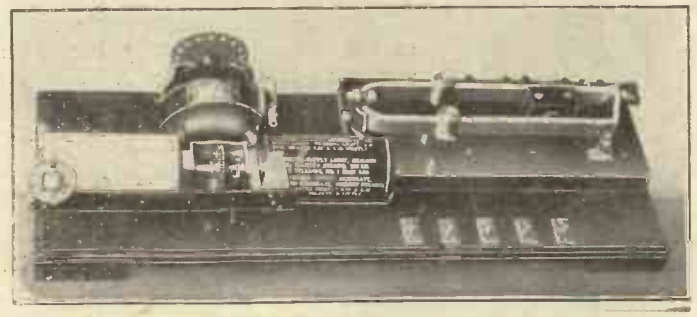
in 1881, the first system for sending and receiving pictures over a wire circuit, and this he called a telephote. Since his system and all of the telephotographic or phototelegraphic systems, as these are called, work on virtually the same principle, I will describe it briefly. At the sending end a ray of light is made to pass through a negative which moves forth and back across its path. The light, the intensity of which is thus modified, falls on a selenium cell; this in turn is connected in the circuit of a telegraph or telephone line and so varies the current in it. At the receiving end the incoming pulsating current operates a shutter which allows a varying amount of light to pass; this light falls on a sheet of sensitised paper that moves to and fro synchronously with the negative at the receiving end.

The next telephotographic system of note after Bidwell's was invented by Alfred Korn, of Germany, in 1904, and he used a mirror galvanometer at the receiving station to throw the light on the sensitised paper. Then came the system of Edouard Bellin, of France, in 1907; he used a Duddell oscillograph instead of the mirror galvanometer, and this worked still better. Several other systems based on practically the same scheme were brought out later by other inventors, but these need not be gone into here.

Transmission of Photographs

The idea of transmitting pictures to a distance without wires is older than wireless itself, for it had its beginnings in the magic lantern; a scheme for projecting a picture for a mile or so by means of an arc lamp and a parabolic mirror was devised by Sig. de Bernochi, of Italy, in 1847. To transmit pictures by wireless waves, however, is quite another thing, but having an apparatus that will transmit them over wires it is not a very difficult matter to connect it up to a wireless set and get not only as good, but far better results, for the inductance that distorts the wave form over long lines is not a factor.

The first system for transmitting pictures by wireless was invented by Hans Knudsen, of Denmark, in 1908, and in this a needle passing over a picture sprinkled with iron filings broke up the current that energised the spark coil of the transmitter. The receiver consisted of a smoked glass plate over which a needle, operated by an electro-magnet and actuated by a coherer, traced a duplicate picture at the receiving end. This system was improved upon by Arthur Körn, of Germany, in 1910, who changed over his wire apparatus to work with a wireless set. In the beginning of his experiments he used a spark-gap transmitter, but later employed an oscillation arc which sent out continuous waves In 1922 Bellin, who had also changed over his wire apparatus to work by wireless, succeeded in transmitting several pictures across the Atlantic Ocean from San Paolo, Italy, to Bar Harbour, Maine, but no other noteworthy demonstration has been given with it since that time.



Transmitter for Photographs.

An improved apparatus for transmitting photographs by wireless was invented by C. Francis Jenkins, of Washington, D.C., in 1924. In his transmitter a negative photographic film is secured to a glass cylinder that is made to rotate and to move along its horizontal axis at the same time by a spring motor; a ray of light is passed through it where it acts on a photo-electric cell. This varies the current that energises a valve. The variations of the oscillations that are set up at the receiving station proportionally varies the intensity of the light from an electric lamp, and this acts on a sensitive photographic film that is secured to a cylinder

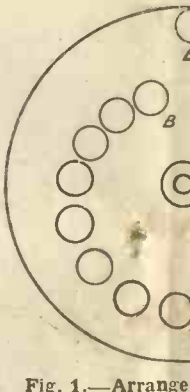
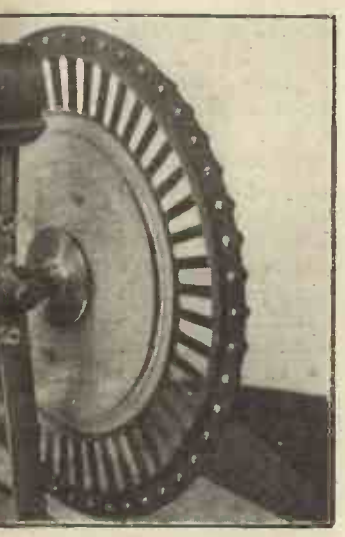


Fig. 1.—Arrange on D

ON ARRIVED?



nkins Television Apparatus.

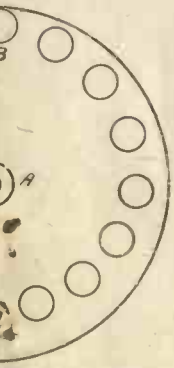
system will have been perfected by means of which we shall receive broadcast visually as well as aurally? This article gives the answer.

A. Frederick Collins.

Another Transmitted Photograph.

like the one on the transmitter and which rotates and moves horizontally at a synchronous speed with it. Photographs that are remarkable for their faithful reproduction have been transmitted across the Atlantic during the past year by this system. Two of these are shown above.

The last word in the wireless transmission of pictures is the photoradiogram system which was invented by Capt. R. H. Ranger, of New York, last year. With his apparatus pen-and-ink pictures are transmitted, and these are reproduced by a pen-and-ink process at the distant receiving station. His transmitter consists of a glass cylinder that rotates at the rate of 1 mm. per second. The point of the light beam is less than $\frac{1}{100}$th of an inch wide. This source of light is placed inside the cylinder and the beam is brought to a sharp focus on the negative film. As the latter rotates the shaded parts of the picture prevent the light from getting through, while the light parts allow it to pass. After it has passed through the film, the light is focused by a lens, where it falls on a sensitive photo-electric cell, and this varies the current of the transmitter accordingly. At the receiving station the incoming waves are changed into oscillations, and by the usual valve detector and amplifiers this is made to operate the armature of a magnet, which in turn works a fountain-pen that draws the picture.



ment of Lenses isc.

A Successful System

Pictures were transmitted by this system from Honolulu over a wire line to the 200-kilowatt wireless station at Kahuhu, Hawaii, where they were broadcast on a 16,975-metre wavelength. The transmission was picked up by the Marshall, California station and relayed over a wire line to Bolinas, Cal., where another 200-kilowatt wireless station sent the picture impulses through the ether overland on a 13,100-metre wavelength. These were picked up by the wireless station at Riverhead, L.I., where they were again relayed and sent over a wire line to New York City, and there the picture was faithfully reproduced after having covered a distance all told of about 5,200 miles.

Television

The word television means seeing electrically at a distance, either with or without wires. The first scheme for television was devised by the writer in 1891, and it consisted of a camera which projected the image on a ground-glass screen that was divided into squares, in each of which was placed a selenium cell. Each cell was connected in circuit with a miniature lamp at the receiving end, and these illuminated like squares on a ground-glass screen, the variation in the intensity of the light reproducing the picture, or at least it was supposed to. A similar scheme was suggested by C. Francis Jenkins, of Washington, D.C., in 1894.

The first apparatus to be actually built for television on this principle was constructed by Ernest Ruhmer, of Berlin, in 1909. His transmitter had a screen that was divided into 25 squares, each with a selenium cell; each of these was connected by a wire circuit to a mirror galvanometer, and for every variation in the resistance of the cell the mirror would throw a light that likewise varied on to the receiving screen. With this demonstration set Ruhmer was able to reproduce perforated patterns that were thrown upon the transmitting screen by a projector. The above schemes are, of course, impracticable, not only because of the complication that a multiplicity of selenium cells and light varying devices entail but also because of the large number of circuits that must be used.

The most successful invention to date to tackle the problem is Jenkins. In his system the rotation of the disc A (Figs. 1 and 2) carrying the lenses arranged in a spiral causes the light L to sweep across the screen M. A revolution every one-sixteenth of a second takes in all parts of the picture and lasts long enough for the eye to see it all at the same time on the principle of motion pictures. The diagrams, Figs. 3 and 4, show some television circuits. The light cell is shown at A, and the oscillator circuit puts a *chopper* frequency on to the radio-carrier wave by the inductive coupling. The other diagram shows an intermittent frequency oscillator to be controlled by a light cell (not shown), the intermediate being put on the carrier wave. With his apparaus Jenkins is able to transmit and reproduce visual images across his laboratory. A. F. COLLINS.

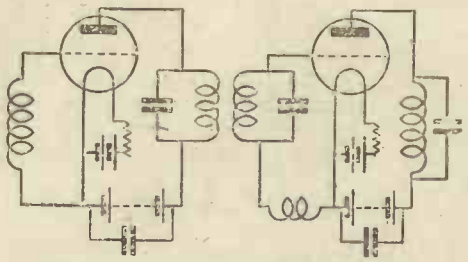
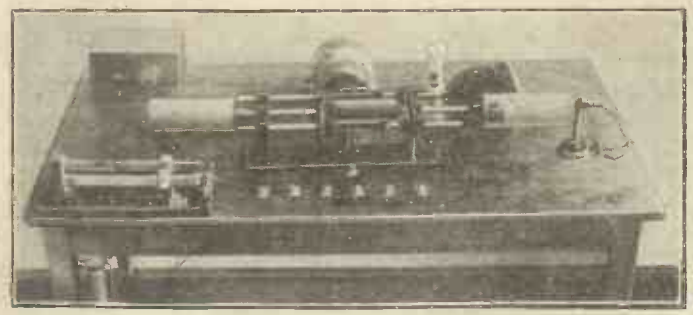


Fig. 4.—Another Television Circuit.

In a subsequent and early issue of "A.W." we hope to give complete working details of the Jenkins' system of television.—ED.

Fig. 2 and other photographs are shown at the bottom of next page).



Receiver for Photographs.

BOSPHOR PRONZ ON PORTABLE SETS

THERE seems to me to have been far too much talk this year in wireless circles on that usual summer topic—portable sets. Such summer talk, of course, cuts no ice at all where an old wireless hand like myself is concerned, but there is unfortunately the chance that the raw beginner in wireless, who is generally inclined to believe all he reads and hears about his new hobby, might possibly absorb this portable-set nonsense.

Now if you are old enough in wireless matters to have cut your wireless wisdom teeth, there will be no need for me to tell you that portable sets belong to the category of things which are often talked about but which are very seldom seen. Do *you* happen to know anybody who ever made a portable set? Of course you do not. But you probably know dozens of folk who *say* they have made a portable set. Rather a difference between making a portable set and saying you have made one, isn't there?

My old landlady's charwoman has a nephew who is errand boy to a greengrocer who once talked to a man in a barber's shop who had made a portable set while he was having his hair cut, but, personally, I have never got any nearer than that to the maker of a portable set.

Still, like all authorities on wireless, I am quite in my element when writing about portable sets, especially if the weather is fine and warm and the barometer stands at "set fair."

The first point of importance about a portable set is that it is a thing over which a wireless man can really let himself go in the way of claiming astounding results. The doubter will raise an eyebrow of interrogation when you claim unusual powers of reception for your home set, but that same doubter will give you the wink of understanding when you enlarge upon the capabilities of your portable set.

Have you ever been in the back parlour of The Cat and Whisker on a wireless night when the talk has run to portable sets and what can be done with them? On one of these famous nights I heard the original and authentic story of a most wonderful portable set which would get all the B.B.C. stations, main and relay, all the European stations except those which had not been opened at that time, and a choice selection of American stations on a big loud-speaker using only two valves and a frame aerial wound on a slate similar to that on the back parlour wall. The designer explained that the set had to be sent near enough to the station it was required to pick up, but that there was no difficulty about that since the set was a portable one. In fact, the designer of the set, just before the clearing-out time signal was received, explained that his method of sending the set about the country was to address it to the various station masters and trust to them in much the same way as some people trust to them their pigeons.

If you have in mind the possibility of your becoming the proud possessor of a portable set, the best thing you can do is to get rid of the idea that there is anything extraordinary about such a set. Dozens of writers who ought to have known better have allowed themselves to write the most utter nonsense on the subject of portable sets. I have even seen a thirteen-valve supertonic chirpodyne oscillator described as just the thing for a portable set. The writer forgot to say, though, that anything from a Ford car to an ocean liner would be required to give the set a reasonable amount of portability.

Has it ever struck you that practically all common or garden wireless sets are portable? I have a receiving set, a fair-sized valve set, which, as occasion demands, does duty in the drawing-room, the dining-room, the den or snuggery, the kitchen or the scullery, the summer-house or even in the garden itself. Quite a portable set in its way—in fact an indoors portable set except when it is used in the garden.

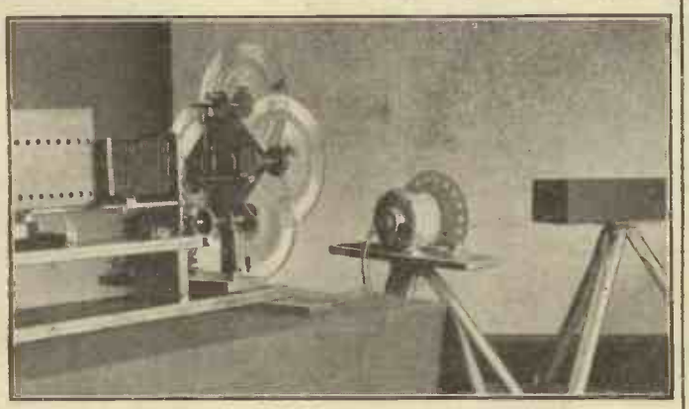
Many of our most efficient commercial sets are portable. I have a friend who has worked his set across the Atlantic to New York, from New York through the Panama Hat Canal to I don't know where before he came home via the Suez Canal and the Bay of Biscay, where roared the dreadful thunder and the atmospherics were something awful. Some portability about that set was there not?

I forgot to say that the friend referred to in the last paragraph is a wireless operator on a freight steamer.

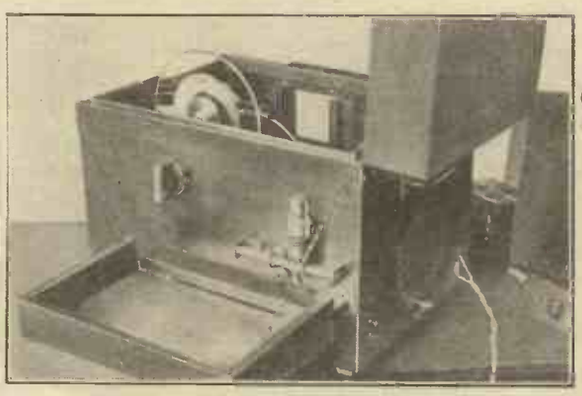
Why is there in the summer-time amongst wireless folk all this rage for portability? It seems to me it comes from the craze for portability brought about by the approach of the holiday season. The portmanteau, the suit-case, the haversack and the sandwich-bag are all going-away signs of portability in the holiday season. The seaside landlady's bed in the bathroom, the seaside donkey and the pierrots' high-frequency bellows harmonium are, having got there safely, signs of portability in the holiday season. The whole of our annual holiday season is a season of portability. No wonder, then, that there

(*Concluded at foot of first column on page* 115)

"HAS TELEVISION ARRIVED?"



Two photographs of the Jenkins Television Apparatus. The prismatic discs can be clearly seen.



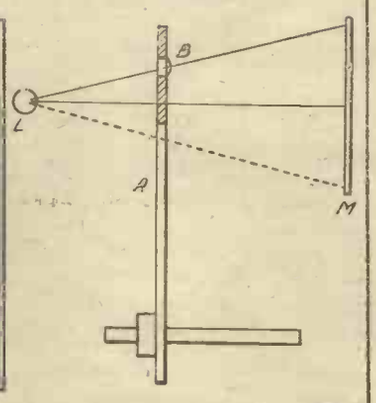


Fig. 2 (bottom right).—Section of Lens Disc.

AROUND THE SHOWROOMS

Ferranti L.F. Transformer

I HAVE received a sample of the Ferranti AF2 low-frequency transformer for test, and hope to publish the actual figures in an early issue.

The appearance of the transformer, however, suggests that it is capable of great things. A large number of laminations form a very solid core (provided with a soldering tag for connection to earth), and the windings themselves are impregnated with some insulating substance to prevent the ingress of moisture.

The Ferranti A.F.2 Transformer.

The connections from the windings to the terminals are of insulated stranded wire and are firmly fixed to the end pieces. There is thus no danger of the fine wire of the windings being broken off short, as I have known happen with several inferior makes of transformer.

The Simplex Connector

MANY novel types of terminal and fastener has been devised for joining wires to terminals under the panel, but there are few gadgets for connecting wires together that do not join at terminals or binding posts.

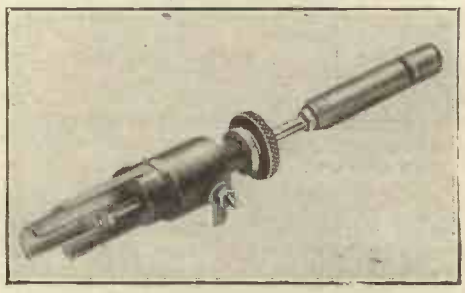
Simplex wire connectors, supplied by J. Martin Blair, of Amberley House, Norfolk Street, Strand, solve what is often a difficult problem in wiring-up. The Simplex connector consists of a small porcelain cone having an interior thread, the diameter of which narrows down sharply to a straight channel towards the apex. The grooves of the threads in the channel are rounded and are shaped in such a way that they grip the wires firmly, twisting them and pressing them at the same time.

The grooves of the threads in the wider part are serrated, enabling them to grip the insulating material covering the wires and making it impossible to pull the wires out of the connector once they are twisted in.

A New Neutrodyne Condenser

WHEN a neutrodyne receiver is used the small neutralising condensers are more convenient to adjust if they have some form of locking device to keep them in position when the correct capacity has been found.

The micrometer condenser, known as the Polar N type, manufactured by the Radio



Polar Neutrodyne Condenser.

Communication Co., Ltd., of 35 Norfolk Street, Strand, W.C.2, embodies a useful locking device. Adjustment of this condenser is effected either by rotating or pushing the ebonite extension handle, a very low minimum capacity being obtainable owing to the careful spacing of the two plates and the use of only the best ebonite for mounting. One-hole fixing is employed and the finish of the condenser is all that could be desired.

Many uses for the micrometer condenser will suggest themselves to the amateur, as the long anti-capacity extension handle allows the condenser to be used for even the highest frequencies without the attendant trouble of hand-capacity effects.

VANGUARD.

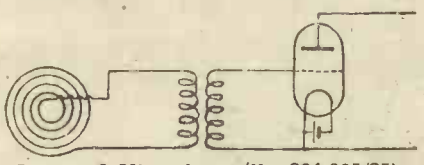
PROGRESS AND INVENTION

Wireless and Toys

A CRYSTAL set may be made to work with very few controls and is therefore suitable to be embodied in many sorts of toys. Patent No. 227,194/24 (L. Sample, Benton, Northumberland) describes a receiving set combined with a toy in such a way that the body of the toy encloses or forms part of the set and a movable part of the toy controls the variable inductance. Several examples are described and illustrated in the specification. The keys of a toy piano may be arranged to control a tapped coil within the case by connecting the tappings to switches beneath the keyboard. The keys also bear on a transverse wire or tape sufficiently slack to permit the depression of only one key at a time. Hinged sconces on the piano front may serve respectively as the crystal holder and a support for the arm bearing the catwhisker.

An Improved Microphone

PATENT No. 234,895/25 (Henry Joseph Round, of 9, Woodberry Crescent, Muswell Hill, London, N., relates to microphones of the magnetophone type in which the movements of a coil suspended in a magnetic field and moved by the incidence of sound waves upon it produce differences of potential which are stepped up by a transformer and applied to the grid of a valve by which they are amplified.



Improved Microphone (No. 234,895/25).

According to this invention the coil is constructed in the form of a spiral and is mounted upon annular support formed of thin paper or other suitable material, the weight of the wire being substantially equal to the weight of the support and of the adhesive by which the wire is secured.

The resistance of the coil is chosen so that the damping resistance usually inserted in shunt across the secondary of the transformer may be omitted.

It is usual to give to the secondary of a speech transformer a natural resonance of about 1,000 cycles per second, and by shunting the secondary with a resistance of about 250,000 ohms fairly uniform response for the range from 200 cycles to 5,000 cycles can be obtained.

So successful were the indoor wireless parties arranged by the Nottingham broadcasting station last winter that the station director (Mr. E. Liveing) has decided on a summer outdoor event. This in all probability will take place at Bulwell Hall Park on August 22.

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. 124).

Aerial Wire

Q.—Why is not ordinary round-section solid wire used for aerials ?—F. G. (Folkestone).

A.—It was established long ago that H.F. oscillatory currents flow mostly on the surface of conductors, penetrating only very slightly into the interior. If round-section wire were used, it is obvious that only a small proportion of the total mass of copper would be utilised to convey the energy. The idea of using stranded wire or tape is to provide as large a surface area in proportion to weight as possible.—J. F. J.

Number of Valves

Q.—How many valves are required to make sure of being able to receive all the main British stations satisfactorily on the loud-speaker ?—L. D. (Birmingham).

A.—To be reasonably certain, at least four valves will be necessary. We suggest an H.F. stage followed by a detector and two note magnifiers. A good aerial and earth will be essential, although this type of receiver is very sensitive. Even then atmospheric conditions may render loud-speaker reception of the more distant stations unsatisfactory on occasions.—J. F. J.

Testing Ebonite

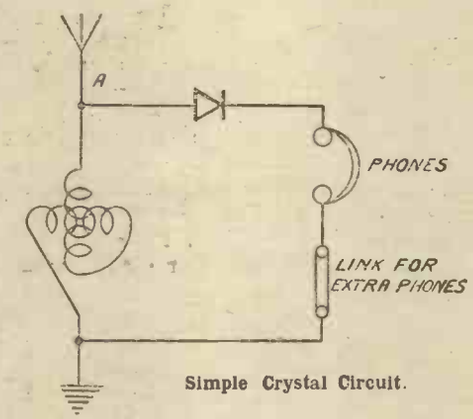
Q.—Can you tell me any simple method of finding out whether a piece of ebonite is of good quality or not ?—R. F. (Birmingham).

A.—The best way is to test the insulation resistance with a megger, but few amateurs are lucky enough to possess one of these expensive instruments. However a good idea of the quality can be obtained by attempting to cut thin shavings from one of the edges; if long thin shavings can be cut the ebonite is probably good, while if the ebonite cut away crumbles into powder it is certainly bad. Good ebonite, when freshly cut, should be distinctly brown in colour; the poorer qualities are often almost black.—J. F. J.

Simple Crystal Circuit

Q.—Would you please supply me with a circuit diagram for a variometer-tuned crystal set, with which either one or two pairs of phones can be used at will ?—C. D. (Bolton).

A.—The required circuit is given herewith.



Simple Crystal Circuit.

When only one pair of phones is in use the unused terminals are shorted by a metal strip or piece of copper wire. When it is desired to use both pairs of phones this shorting strip is removed and the phones substituted.—J. F. J.

Measuring Filament Voltage

Q.—I have bought a voltmeter with the object of checking the voltage applied to my valves but am puzzled with regard to the proper use of this instrument. When the valves are alight and I connect the voltmeter across the filament legs of one, the filament brightness decreases. When I take the valve out of its socket and apply the meter to the filament legs I get a reading practically the same as that of the accumulator, even though the filament resistance is in circuit.—R. G. L. (S.W.9).

A.—In the first place your instrument is quite unsuitable if the filament brightness alters when the voltmeter is connected across the filament. This shows that the meter has far too low a resistance. When the valve is in use the voltage drop of the accumulator is divided between the rheostat and the filament in the proportion of their respective resistances. Now, when the voltmeter is connected across the empty socket, the voltage of the accumulator is divided between the rheostat and the voltmeter, also in proportion to the resistance of each. As the resistance of the voltmeter winding is far higher than that of the filament rheostat (even though it may be lower than is desirable), practically the whole of the accumulator voltage is registered by the meter. The proper way to check the voltage applied to the filament is to connect the voltmeter across it when it is glowing at normal brilliancy.—M. B.

Signals without Aerial

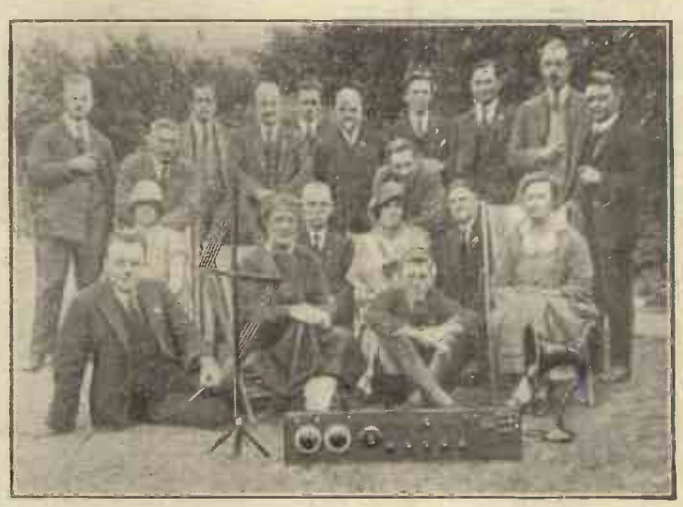
Q.—I have a one-valve set and have noticed that I can receive the Manchester station, over twelve miles away, with the aerial disconnected. As I have never heard of this being done before, can you explain the occurrence ?—M. M. (Lancs.).

A.—This experience is by no means uncommon. In some circumstances it is possible for the tuning coils and the internal wiring of the set to pick up sufficient energy to produce signals in the telephones. This is sometimes called working on "capacity" aerial.—J. F. J.

Phone Condenser

Q.—What size condenser should be used across the phones in a simple variometer-tuned crystal set ?—N. C. (Bolton).

A.—A .001 or .002-microfarad condenser may be tried, but the capacity of the phone leads and winding is usually quite sufficient without any external capacity.—J. F. J.

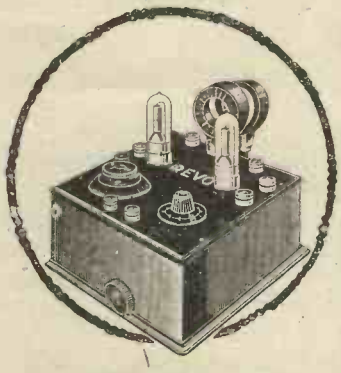


A WIRELESS FIELD DAY

Some members of the Sheffield and District Wireless Society on the occasion of their annual outing.

BE A SPORT!

—she's got her eye on a "REVO" WIRELESS SET.



GIVE her the pleasure of a *good* loudspeaker set —while you are at business give her the fun of the morning concert and the Woman's Hour.

Easily handled by any woman, the **Revo-Magna** is easily tuned and ever-ready. Uses dull or bright emitter valves. Gives good *pure* loudspeaker reproduction up to 15 miles from any main B.B.C. station, and 100 miles from 5XX (or the new Daventry station). **Guaranteed for 12 months.**

£5

(Marconi Royalty 25/-)

WITH DULL EMITTER VALVES

Prices	£	s.	d.
Cat. No. W.4650 Receiver only ..	5	0	0
Set of Coils, 300/600 metres	0	13	0
2 Dull Emitter Valves	1	13	0
2 Special Exide Cells, 4 volts ..	0	13	0
Battery, 60 volts	0	14	6
Aerial Equipment	0	7	6
One Pair Headphones	0	19	6
High Power Station Coils	0	13	0
Total	£10	13	6

WITH BRIGHT VALVES

Prices	£	s.	d.
Cat. No. W.4650 Receiver only ..	5	0	0
Set of Coils, 300/600 metres	0	13	0
2 Valves, A.R. Type	0	16	0
Batter, 60 volts	0	14	6
6 volt Accumulator	2	14	0
Aerial Equipment	0	7	6
One Pair Headphones	0	19	6
High Power Station Coils	0	13	0
Total	£11	17	6

For best results use a **Revo Baby Loudspeaker** — only 25/-. Also guaranteed 12 months. At your nearest dealer or direct:

THE CABLE ACCESSORIES CO., LTD.
TIVIDALE, TIPTON, STAFFS.

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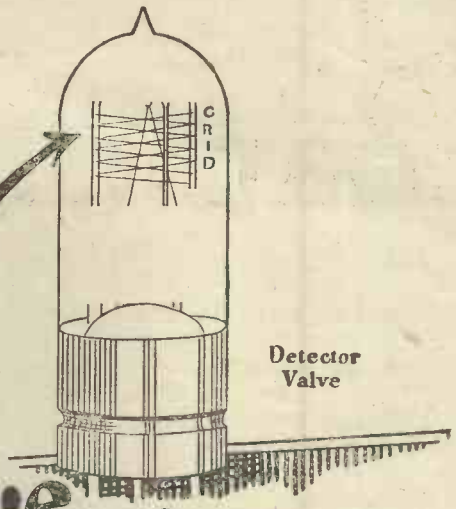
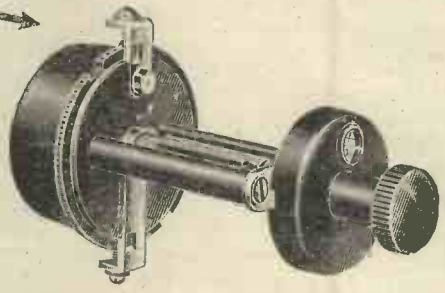


It's here—that a lot of distortion occurs

smooth it away with this →



IGRANIC Variable Grid-Leak

A *fixed* grid-leak cannot be expected to overcome it when the set is required to work under fluctuating conditions with varying anode voltages. You must have a *variable* grid-leak and a good one too!

The Igranic Variable Grid-Leak is such. It has a resistance range of from zero to five megohms which, as you probably know, is the range most suited for obtaining good rectification with maximum signal strength.

A special feature which will readily be appreciated is that the rubbing contact is driven through an ebonite stem and all the electrical parts are well spaced from the surface of the panel. By this means the leak can be connected in any part of the circuit without risk of detrimental effects being produced when the hand is brought near the surface of the panel in the process of tuning.

The dial is of unique design, and consists of a clearly marked ivorine scale revolving behind a moulded cover. Price 8s. 6d.

All reputable dealers carry stocks.

IGRANIC RADIO DEVICES include:

Honeycomb Duolateral Coils, Variable Condensers, Fixed Condensers, Filament Rheostats, Intervalve Transformers, Variometers, Vario-Couplers, Coil Holders, Potentiometers, Vernier Tuning Devices, Switches, etc. etc.

All carry the IGRANIC guarantee.

Write for List Z.627.

IGRANIC ELECTRIC COMPANY LIMITED

149 Queen Victoria Street, London

Works: BEDFORD.

BRANCHES: Birmingham, Cardiff, Glasgow, Leeds, Manchester, Newcastle.

IN broadcasting Conradini and his orchestra from the Royal Princes Parade, Bridlington, recently, the Sheffield station set up a record for the most distant outside broadcast which has yet been attempted by the B.B.C.

In the intervals of the Berlin evening concert, now relayed on 1,300 metres by Königswusterhausen, a morse signal is transmitted for periods of three seconds as a tuning signal and in order to help listeners to identify the station.

The new relay station now being built at Elberfeld will be in operation towards the beginning of September. It will take its programmes from Munster.

All programmes of W G Y, Schenactady, may now be received on four different wavelengths. This will considerably facilitate the search for this station, and will establish the most favourable wavelength for DX transmission. The evening programme is now broadcast through W G Y on 379.5 metres, 2 X A F on 38 metres, 2 X X on 109 metres, and 2 X A H on 1,660 metres, the last three being special experimental stations of the General Electric Co.

The Impresario, a light opera by Mozart, of which an English translation has been prepared by Mr. Kingsley Lark, who is himself taking the title rôle, will be broadcast for the first time from London on Wednesday, August 5. Preceding this, half an hour's entertainment will be given by the "Three Aces," the remaining units of the now dissolved "Pack of Cards" concert party, who have been heard at most B.B.C. stations in the past.

The N S F station at Hilversum has been recently transmitting on short wavelengths, and with experimental plant has been in communication in broad daylight on 90 metres with the Dutch Indies. The messages were also, according to report, received at Melbourne, Australia.

A further miniature recital by Mademoiselle Beatrice de Holthoir will be the feature on Thursday, August 6. On the same evening popular sea chanties, folk and old army songs will be broadcast by John Goss and the Cathedral Male Voice Quartet. The programme will be divided into two portions by an interlude of saxophone and piano duets.

The Dortmund-Dorstfeld relay station, to be run by the Westdeutsche Funkstunde at Munster, will be ready towards the end of this month. Successful tests were recently made on 260 metres, and the station will be transferred to Bochum on evacution of the Ruhr district by the occupying allied troops.

A new musical extravaganza on the lines of *Winners* will be the subject of an S.B. on August 11.

It is stated that nearly ninety stations are now working in Europe on wavelengths between 200 and 600 metres, while another forty are projected which will operate in this band.

The Vladimoff Balalaika orchestra, with songs by Helen de Frey and Russian pianoforte music interpreted by Mr. Edward Mitchell, will follow a "bran tub lucky dip" programme on Friday, August 7.

The first real broadcasting play will be transmitted on August 9 from 2 L O. It is a "mystery" play in modern style by a new author. The play transmissions are being rapidly developed in view of their success.

For the first time in its history the Welsh National Eisteddfod, to be held at Pwllheli in the first week of August, is to be broadcast. The proceedings include the Premier's speech from the chair on Tuesday afternoon, and Mr. Lloyd George's speech on Thursday.

July 27 marks the opening ceremony of the new B.B.C. high-power station at Daventry. An inaugural speech will be given by H.M. Postmaster-General (Sir William Mitchell-Thomson), introduced by the chairman of the B.B.C., the Rt. Hon. Lord Gainford. The Mayor of Daventry will also speak. An excellent programme has been got together for this signal occasion, including such well-known artistes as Peter Dawson (bass), Kate Winter (soprano), Walter Hyde (tenor), Norman Allin (bass), Miss Daisy Kennedy (solo violin), and Foden Williams (entertainer). The 2 L O Military Band, conducted by Dan Godfrey, will assist.

Plans have been prepared for the erection of two high-power wireless telegraph stations in Jamaica and Bermuda. The enterprise will be undertaken by the Direct West India *via* Bermuda Cable Co.

A direction-finding station has been established at Georgetown, British Guiana.

No definite action has yet been taken by the British Broadcasting Co. in respect of the suggestion for a new station on the southern outskirts of London.

The third of Mr. Reginald Goss-Custard's organ recitals, relayed from the Bishopsgate Institute, will be the subject of an S.B. from London on Sunday, August 2. Organ transcriptions of famous Wagnerian excerpts will be featured, and include the *Meistersingers* overture, "Traume," a study from *Tristan and Isolde,* and the popular "Ride of the Valkyries."

There are at present five masts erected at the new Dorchester station, which is to maintain communication with New York. Each mast is 277 feet high, and the weight of each mast is 45 tons. Oil engines driving direct-current generators will provide the necessary power, and the various voltages required for the operation of the valves will be supplied by motor generators. The valves, which will be of the water or oil-cooled type, will be housed in a building adjacent to the power-house.

Bank Holiday night, Monday, August 3, has been chosen for the transmission of a series of jovial songs to be sung by Frederick Collier, a B.N.O.C. baritone. The humorous portion of the entertainment has been entrusted to Mabel Constanduros; a short sketch by this artiste entitled "In the Tram" will be included. As a special "stunt," from 9 to 10 p.m., a popular concert party will be relayed from one of the leading seaside resorts.

An important event in the shape of a concert, conducted by Sir Hamilton Harty with the Wireles Symphony Orchestra, will be the attractive feature of Tuesday, August 4. Mr. Harty is including in this programme such works as Berlioz's "Royal Hunt and Storm in the Forest," a popular item in his Hallé programme at Manchester, and Bach's suite in B minor for flute and strings. This is Sir Hamilton Harty's first public appearance in London since his knighthood.

Edinburgh will celebrate a house warming at its new premises on July 31. Captain P. P. Eckersley, after a comparatively long absence, will again be heard.

Two interesting talks are down for July 29, namely "Making the Modern Motor Road," given by Mr. J. B. Killick, a subject which will appeal to all car-owners, and Mr. Hermann Klein's talk, "Singing and Acting by Wireless."

A programme relayed from the band-stand near the Serpentine, Hyde Park, will provide the evening's entertainment on Sunday, August 2.

The Downs Committee of Bristol have granted permission to the Bristol Wireless Co. to give one or two concerts on the Downs. The whole of the proceeds will go to the Lord Mayor's Hospital Fund or to a fund set aside for the purpose.

Messages broadcast by divers from the bed of the Atlantic several miles off Atlantic City were received by 5,000,000 amateurs in the United States recently.

It has been arranged that the Sheffield station shall work on 303 metres and Toulouse on 299 metres, as the latter station has been found to interfere with transmission from Sheffield.

CHIEF EVENTS OF THE WEEK

SUNDAY, July 26

ALL STATIONS	5.30	Poetry and Dramatic Recital.
Aberdeen	9.15	"Coffee and Cupid" (Bach).
Edinburgh	8.0	Community Hymn Singing Concert.

MONDAY

5 X X & ALL STATIONS	7.30	Speeches at the Official Opening of the New High-power Station at Daventry.
Birmingham	8.0	Instrumental Solos.
Newcastle	6.0	Instrumental Music and Some Songs
Glasgow	8.0	Ballad Concert.

TUESDAY

ALL STATIONS except 5 X X	8.0	Ballad Concert.
	9.0	*Radio Radiance* Revue.
5 X X	8.0	Bach Programme.

WEDNESDAY

London	8.0	Comic Opera *The Dogs of Devon.*
Cardiff	8.0	Liza Lehmann Programme.
Manchester	8.0	Classical Programme.
Newcastle	8.0	Chamber Music and Violin Recital.
Glasgow	8.0	Scottish Memories.
Belfast	7.30	Symphony Concert.

THURSDAY

London	9.0	Chamber Music.

FRIDAY

London	8.0	Light Classical Programme.
Cardiff	8.0	"Adventure Afloat."
Belfast	7.30	Liszt, and Excerpts from Grand Opera.
Edinburgh	8.0	"A House Warming" at the new premises.

SATURDAY

London	8.0	Melody, followed by the "Roosters."
Birmingham	8.0	Orchestral Music and Songs.
Bournemouth	8.0	Band of the Royal Tank Corps.
Cardiff	8.0	Music of Russia.
Manchester and 5 X X	8.0	*Cavalleria Rusticana* (Mascagni) followed by *The Meistersingers* (Wagner).
Newcastle	8.0	Selections from *Maritana, The Bohemian Girl*
Aberdeen	8.0	Scottish Programme.

"BOSPHOR PRONZ ON PORTABLE SETS" (*continued from page* 110)

is so much talk of portable sets at this time of the year.

Take my tip, though. If you must have a portable set for the holiday season, don't make one but make one up. You will then be much better able to hold your own amongst your wireless friends when it comes to a recount of the doings of your portable sets on holiday. If you actually make a portable set, you will handicap yourself most severely.

Although there is already a galaxy of practical advice in this little article, I must finish with a further bit of practical advice on the choice of a circuit for the portable set which you hope to make up. Should you decide to go to any part of Wales for your holiday, the Flewelling circuit is indicated for your portable set. If you go to Germany, then obviously you must have a Rhineartz portable receiver. For the Newcastle district the Coalpitts circuit is far and away the best, while if you go into the jam country for your holiday, there is no better choice than the Hartley circuit.

H.M. the King has subscribed £100 to the fund which is being promoted for equipping all the London hospitals with wireless apparatus.

The B.B.C. will, during next winter, renew their experiments in connection with an exchange of programmes between England and America.

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. (Tues., Thurs., Fri.); 3.15, transmission to schools (exc. Sat.); 3.30-5.30, con. (Sun.); 4-5 p.m., con., relay of Wembley bands (Mon.); 5-6, light music; 6.0-6.30 p.m., children; 6.40 p.m., light music; 7-8 p.m., time sig., news, music, talk; 8.0-10 p.m., music; 10.0-10.30 p.m., time sig., news, talk; 10.30-11 p.m., special feature (Mon., Wed., Fri.). Tues. and Thurs. the Savoy Bands are relayed until 11.30 p.m., and on Sat. until midnight.

Aberdeen (2BD), 495 m. **Belfast** (2BE), 439 m. **Birmingham** (5IT), 479 m. **Bournemouth** (6BM), 386 m. **Cardiff** (5WA), 353 m. **Glasgow** (5SC), 422 m. **Manchester** (2ZY), 378 m. **Newcastle** (5NO), 403 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), 338 m. **Sheffield** (6FL), 302 m. **Stoke-on-Trent** (6ST), 306 m. **Swansea** (5SX), 482 m. **Daventry** (20 kw.), opening July 27, 1,600 m.

Chelmsford (high-power station), 1,600 m.

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.). 11.00, con. (Tues., Thurs., Sat., Sun.); 13.10, time sig., weather; 15.30, con.; 17.15, children (Thurs.); 19.25, news, weather, time sig., con., lec., news; 20.00, con.; 22.00, dance (Wed., Sat.).

Graz, 404 m. (500 w.). Relay from Vienna.

BELGIUM.

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

CZECHO-SLOVAKIA.

Prague (Strasnice), 555 m. (1 kw.). 11.00, con. (Sun.); 17.15, con. (Wed., Sat.); 19.15, con.

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

DENMARK.

Copenhagen (Kjobenhavns Radiofoni 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.

Lyngby (OXE), 2,400 m. (1½ kw.).

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

FRANCE.

Eiffel Tower, 2,650 m. (5 kw.). 06.40, weather (exc. Sun.); 12.00, markets (exc. Sun. and Mon.); 12.15, time sig., weather; 15.45, 16.30, Stock Ex. (exc. Sun. and Mon.); 18.15, con.; 20.00 and 23.10, weather; 20.30, 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., con. (Thurs.); 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 3rd Thurs. in month (15 kw.).

L'Ecole Sup. des Postes et Télégraphes (PTT), Paris, 458 m. (800 w.). 20.00, Engl. talk (Tues.), children (Thurs.); 20.30, lec. or con., almost daily.

"Le Petit Parisien," 345 m. (500 w.). 21.30, con. (not daily).

Radio-Toulouse, 275 m. (2 kw.). 12.30, weather, Stock Ex., markets, news; 20.30, news, lec.; 22.00, con.

GERMANY.

Berlin (Vox Haus), 505 m. (1½ kw.). 09.00, sacred con. (Sun.); 11.00, con. and tests; 12.55, time sig., news, weather; 15.00, educ. hour (Sun.), markets, time sig.; 15.30, children (Sun., Wed.); 15.35, Esperanto (Sat.); 16.30, children (Tues.); 17.00, orch.; 18.40, lec., women; 19.00, French (Mon.), lec.; 20.30,* con., weather, news, time sig.; 22.30, dance (Thurs., Sat., Sun.).

Königswusterhausen (LP), 1,300 m. (6 kw.). 11.30-12.50, con. (Sun.); 20.30, relay of Berlin (Vox Haus) con. (daily); 2,525 m. (5 kw.), Wolff's Buro Press Service: 06.45-20.10; 2,900 m.: Telegraphen Union: 08.30-19.45, news. 4,000 m. (10 kw.): 07.00-21.00, news.

Breslau, 418 m. (1½ kw.). 12.00, con. (daily); Divine Service (Sun.); 12.55, time sig. (Sun.), weather, Stock Ex., 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.).

Frankfort-on-Main, 470 m. (1½ kw.). Relay by Cassel (288 m.). 08.00, sacred con. (Sun.); 11.55, time sig., news; 12.55, Nauen time sig.; 16.00, con. (Sun.); 16.30, con.; 17.00, children (Sun.); 18.00, markets, lec.; 20.00, lec., con., news, weather, dance.

Hamburg, 395 m. (1 kw.). Relayed by Bremen (279 m.), Hanover (296 m.). Sundays: 07.25, time sig., weather, news, lec.; 09.15, sacred con.; 13.15, con.; 15.15, Esperanto, con.; 18.00, con.; 19.15, sports, weather, con. or opera, dance. Weekdays: 05.45, time sig., weather; 06.50, news, weather; 12.55, Nauen time sig., news; 14.00, weather, con.; 16.15 and 18.00, con.; 19.00, lec., English (Tues., Sat.), Spanish (Mon., Thurs.); 19.55, weather, con.; 22.00, dance.

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

Leipzig, 454 m. (700 w.). Relayed by Dresden (292 m.). 08.30, sacred con. (Sun.); 11.00, educ. hour (Sun.); 12.00, con. (daily); 12.55, Nauen time sig., news; 16.30, con., children (Wed.); 20.15, con. or opera, weather, news, cabaret or dance (not daily).

Münich, 485 m. (1 kw.). Relayed by Nuremberg (340 m.). 11.30, lec., con. (Sun.); 14.00, time sig., news, weather; 16.00, orch. (Sun.); 16.30, con. (weekdays); 18.30, con. (weekdays); 19.15, lec; 19.30, con. (Sun.); 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., con.

Stuttgart, 443 m. (1½ kw.). 11.30, con. (Sun.); 16.30, con. (weekdays); 17.00, con. (Sun.); 18.30, time sig., news, lec., con. (daily); 21.15, time sig., late con. or cabaret.

FINLAND.

Helsingfors, 370 m. (1 kw.). 09.00, sacred service (Sun.); 19.00, time sig., weather, news, opera (daily).

HOLLAND.

Amsterdam (PCFF), 1,955 m. (1 kw.). Daily: 07.55-16.50 (exc. Mon. and Sat., when 10.50-11.50), news, Stock Ex. (PA5), 1,050 m., 20.20, con. (Wed.).

Hilversum (HDO), 1,060 m. (2½ kw.). 10.40, sacred service (Sun., irr.); 12.20, police news (irr.); 14.10, orch. (Fri., Sat., Sun.); 17.25, women (Fri.); 18.10, orch. (Mon., Tues., Wed., Thurs.); 18.40, children, orch. (Mon.); 19.10, orch. (Fri., Sat.); 20.30, orch. (Sun.), sacred con. (Wed.), relay of Amsterdam con. (Thurs.); 20.55, Scheveningen Kurhaus con. (Wed., Fri.).

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

HUNGARY.

Buda-Pesth Csepel), 565 m. (2 kw.). 20.00, con., news, lec. (Tues., Thurs., Sat.).

ITALY.

Rome (1RO), 425 m. (2½ kw.). 10.30, sacred con. (Thurs. and Sun.); 13.00, official communiqué; 14.15, relay of orch. from Palace Hotel; 16.45, children; 17.15, relay of orch. from Hotel di Russia; 17.40, news, Stock Ex., Jazz band; 20.30, news, weather, con.; 22.15, late news, Jazz band.

Milan, 308 m. (1½ kw.). Under construction.

JUGO-SLAVIA.

Belgrade, 1,650 m. (2 kw.). 18.30, con., news, weather (daily).

NORWAY.

Oslo, 382 m. (1.2 kw.). 11.00, Divine service (Sun.); 11.30, Stock Ex.; 13.15, markets; 19.15, time, news, lec., con.; 22.00, time, weather, news, dance relayed from Hotel Bristol, Oslo. **Aalesund,** 515 m. Testing.

POLAND.

Warsaw (PTR), 385 m. (½ kw.). 18.00; 20.00 (irr.).

RUSSIA.

Moscow (Central Wireless Station), 1,450 m. Sundays: 16.30, news and con. Weekdays: 16.30, news, 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 (EAJ6), 392 m. (3 kw.). 23.00, time sig., lec., con.

Madrid (EAJ7), 430 m. (6 kw.). Daily: 15.30, con.; on even dates, 23.00-01.00; on odd dates, 19.00-21.00.

Barcelona (EAJ1), 325 m. (1 kw.). 18.00, lec., markets, Stock Ex., con.

Barcelona (Radio Catalana) (EAJ13), 433 m. (2 kw.). 19.00 and 23.00, con.

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

Seville (EAJ5), 350 m. (1 kw.). 22.00, con., news, weather.

San Sebastian (EAJ18), 425 m. (500 w.). Testing.

Salamanca (1 kw). Under construction.

SWEDEN.

Stockholm (SASA), 427 m. (500 w.). Sundays: 12.00, sacred service; 17.00, children; 18.00, sacred service; 20.00, con.; 21.00, news, con., weather. Weekdays: From 12.30 onwards S.B. from Stockholm to Gothenburg (SASB), 290 m.; Malmo (SASC), 270 m.; Sundsvall (SASD), 545 m.; Boden (SASE), 1,370 m.; Falun (SMZK), 370 m. (thrice weekly); 12.30, weather, Stock Ex., time sig.

(12.55); 20.00, lec. (irr.), then same as Sun.; 22.00, dance (Wed., Sat.).

Gefle, 360 m. (250 w.).

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

Linkoping, 523 m. (250 w.).

Norrkoeping (SMVV), 250 m. (250 w.).

Karlstadt (SMXC), 355 m. (250 w.).

Trollaattan (SMXQ), 345 m. (250 w.). As Falun.

SWITZERLAND.

Lausanne (HB2), 850 m. (500 w.). 20.00, lec. con. (daily).

Zurich (Höngg), 515 m. (500 w.). 12.00, weather; 12.55, Nauen time sig., weather, news, Stock Ex.; 13.30, piano soli; 17.00, con. (exc. Sun.); 18.15, children, women (Mon., Wed.); 19.00, weather, news (exc. Sun.); 20.15, lec., con., dance (Fri.); 21.45, news.

BROADCASTING INTERFERENCE

A Note on the Geneva Conference

IN our next issue we hope to have an illuminating article and report of the proceedings of the International Broadcasting Conference just concluded at Geneva. Below is a brief summary, giving some indication of the results arrived at, which comes to hand as we go to press. The agreement reached was that until the end of next month each station will individually study this serious question of interference with a view to alleviating it by a judicial alteration in wavelengths. Captain P. P. Eckersley, of the B.B.C., who acted as chairman of the Engineers' Conference, has returned to London. It was suggested that the European waveband for all broadcasting stations, either already established or proposed, should be comprised within 200-600 metres, the portion 300-500 being that which has been most favoured up to the present and on which all main and relay B.B.C. stations are operating. In view of newcomers, considerable interference has been suffered by many of the older stations, and for this reason the favoured band has been extended in one direction.

Wavelengths have consequently now been allotted to all stations, and tests will be carried out simultaneously on September 1. The conference decided that priority of choice should be given to the older-established stations, and as a result their wavelengths will in most instances only be slightly modified.

Minor and relay stations, whether of recent or older date, will have to give way, but each country represented at the conference will be entitled to possess at least one station operating on the favoured band. Capital stations of recent inauguration will be given preference. These suggestions have been put forward by the conference, but it must be borne in mind that a departure from allotted wavelengths can be authorised by the respective Governments only, and the individual broadcasting concerns must take the necessary steps in the matter in order to obtain these concessions.

MATTERS CONTINENTAL

NEW STATION FOR AMSTERDAM

THE suspension of the concerts which, up to the present, have been regularly transmitted by PX9, a small privately owned broadcasting station at Amsterdam, leaves that important city solely with PA5, which only works at irregular intervals. It is true that Amsterdam is served by HDO (Hilversum), which is at no great distance, but many complaints have been made by Dutch listeners regarding more interference on that wavelength, and the bulk of the amateurs turn to 5XX. It is thought that some energetic move should be made to supply Amsterdam's population with a regular and effective service, and as the Dutch Posts and Telegraphs appear to take no interest in the matter, a new company, under the title of Radio Omroep Amsterdam, has been formed by Holland's leading manufacturers and dealers of wireless components.

At the outset the scheme was enthusiastically received and but little difficulty was encountered in securing sufficient capital to warrant a start being made on the construction of a modest 250-watter, but as further material support has now been obtained it is proposed to install a 1½-kilowatt station, the running expenses of which will be covered by voluntary contributions.

BROADCASTING IN RUSSIA

CONSIDERABLE progress in wireless broadcasting has been made in Russia since the Soviet Government passed the Telephony Bill in July last. Moscow possesses four stations and already numbers about 50,000 listeners, but owing to the fact that, although wireless apparatus is allowed, each set must bear an official "seal," about sixty per cent. of the hearers in that city are—pirates! The Russian Wireless Association has already registered over 100,000 members. Three of the Moscow stations provide regular daily concerts (*vide* "Broadcast Telephony"), and have now made arrangements for the relay of opera from the local theatres. News bulletins are given out daily by the Russian Telegraph Agency "Rosta" on 1,450 metres for the benefit of the various newspapers. In order to further the progress of wireless, the authorities have established in Moscow seven consulting bureaux, from which interested amateurs can secure technical information and advice for making receiving apparatus at home.

New wireless telephony stations are now in operation at Kharkov, Rostov and Taschkend; there are at present in Russia ten broadcasting centres, including those in Moscow, Leningrad, Nijni-Novgorod.

Experiments are being made with a high-power transmitting station in course of erection at Moscow, and from which the Soviet authorities hope to "flood" Europe with "official news and lectures," or, in other words, the Bolshevik type of propaganda.

RADIO-TOULOUSE

CONSIDERABLE interference has recently been caused to Sheffield (301 metres) by the new 2-kilowatt Radio-Toulouse broadcasting station operating in the immediate neighbourhood of 300 metres. The trouble having been pointed out to the French station by the International Bureau of Geneva, the trouble was quickly remedied by Radio-Toulouse reducing its wavelength to 275 metres and by Sheffield going up 1 metre.

Listeners will have no difficulty in identifying this newcomer, as all transmissions are opened with "La Toulousaine," a local military march played by the station orchestra. Moreover, each item is preceded by the abbreviated call: "Ici Radio-Toulouse," but in order that no confusion should be made with the competitive station erected by the French Posts and Telegraphs, now testing, in the same locality, at frequent intervals, during the evening the full call is given, namely, "Allô! Allô! Ici le poste de Radio-Toulouse. Emissions de la Sté Régionade de Radiophonie du Midi."

Details regarding times of transmission will be found under "Broadcast Telephony."

A programme that will recall the early days of the war will be given at Manchested on Monday, August 3. As an introduction, the 2ZY Orchestra will play the British, French, Belgian and Russian National Anthems. The lighter side of these troublous days will be recalled in songs, such as "When We've Wound up the Watch on the Rhine" and in "Memories of 1914," a group of syncopated duets by Miss Jean Paul and Miss Leoni Lascelles. Other popular tunes of the period will be played by the 2ZY orchestra.

It is estimated that in the United States there are 2,500,000 wireless receivers in use, as compared with 9,000,000 gramophones.

The Cape beam wireless station is expected to be ready by September or October.

Weather bulletins are to be broadcast by coast wireless stations and the B.B.C. for the benefit of vessels having only small receiving sets.

WIRELESS IN PARLIAMENT

From Our Own Correspondent.

ON Friday, July 10, Sir Wm. Mitchell-Thomson, the Postmaster-General, moved the second reading of the Wireless Telegraphy (Explanation) Bill. He said that arrangements for holding a Government inquiry into the future of broadcasting in this country were being made. This investigation would be of the most comprehensive character, and he hoped it would be opened in November. The purpose of the present Bill was to remove any doubts which might exist as to the validity of the system of licences granted under the Wireless Telegraphy Act, 1904. That Act provided that licences granted to experimenters should not be subject to rent or royalty, and that the present Bill provided that the expression "rent or royalty" should not include fees charged in respect of the grant for renewal of licences. After stating that it was not intended to raise the fees to experimenters, the Postmaster-General said that it was originally expressly provided that fees should not be charged in respect of purposes other than for the transmission of messages. On the strength of this, certain owners of crystal sets had declined to pay, claiming that they did not "transmit." In these days transmission had a technical meaning, but in the days when the original Act was passed it had not. In order to avoid litigation he had decided to take parliamentary action. It would be impossible to carry on a system of broadcasting under which one set of listeners paid for the programmes and the other did not. The present Bill would remedy that state of affairs and all listeners would in future be equally liable.

The second reading was agreed to.

The Empire Chain

Mr. Ammon asked the Postmaster-General whether, in connection with the development of the Empire wireless chain, the sites had yet been acquired for the erection of the signalling stations for communicating between Great Britain and Australia and India?

Sir W. Mitchell-Thomson said that sites near Grimsby (for the transmitting station) and near Skegness (for the receiving station) had been selected for the beam stations for communication with Australia and India, and it was hoped that the purchase of the various properties concerned would be completed at an early date. The order for the erection of these stations had already been placed with the contractors.

B.B.C. Matters

Captain Garro-Jones asked the Postmaster-General whether he was aware that the British Broadcasting Co. is producing a journal known as the *Continental Radio Times,* whether the terms of the agreement between the British Broadcasting Co. and himself admitted of the carrying on of a newspaper and publishing business, and what it was proposed should be done with the profits from this journal?

Sir W. Mitchell-Thomson said he understood that the British Broadcasting Co. was arranging to issue a periodical, to be known as *The Radio Supplement,* containing detailed programmes of foreign stations, which now appeared in abbreviated form in *The Radio Times.* The issue of such a periodical would not be contrary to the terms and the agreement between the company and the Post Office. The financial arrangements were being discussed between the company and the broadcasting organisations whose programmes would be published, and any net profit which might accrue to the company will fall to be dealt with as income under the general conditions of their licence.

Sir Robert Gower asked the Postmaster-General whether his attention had been called to the profits made by the British Broadcasting Co. during the past financial year, and, seeing that the extent of such profits was largely due to the sum received in respect of licence fees, would he consider the desirability of reducing the licence duty paid by users of receiving sets?

Sir W. Mitchell-Thomson replied that the whole of the profits received by the British Broadcasting Co., after their payment of 7½ per cent. dividend, which absorbed £5,172, had been invested in additions to plant. The Postmaster-General did not propose to reduce the licence fee pending the report of the committee which the Government were about to appoint to examine the arrangements, financial and otherwise, for the maintenance of the broadcasting service.

"**Every Man His Own Bricklayer**" is the title of an illustrated article appearing in the current issue of "The Amateur Mechanic and Work" (3d.), and gives practical information that will be useful to anyone who desires to do small jobs in bricklaying. Other articles appearing in the same number are: "Curbs and How to Make Them"; "Indoor Renovations"; "A Small Outside Larder or Meat Safe"; "Motor-cycle Valve Troubles"; "An Artistic Crystal Set"; "Hints on Wiring a Valve Set"; "A Device for Drilling Metal by Hand"; "Improving a Dutch Oven"; "Turning a Watch Balance Staff"; "Making a Revolving See-saw"; "Making Money by Inventing"; "Photographic Weather," etc. etc.

The programme for July 31 is devoted to light classics, including the 'cello concerto of Saint Saëns, to be played by Miss Vyvyan Lewis. Mendelssohn's Italian Symphony will follow. At 9 p.m. "An Hour in the Garden," written specially by Mr. Guy Reeve, will be broadcast under John Henry's direction.

An inquiry into the whole future of the system of broadcasting is to be started in November.

An interesting wireless experiment, substituting in a Norwich church the whole service broadcast from a London church, was carried out with complete success recently at St. Bartholowmew's, Heigham, Norwich. The service received was the one broadcast from St. Martin-in-the-Fields, Trafalgar Square, London. Everything was heard distinctly through the loud-speaker placed in the pulpit.

THE B.B.C. CHAIRMAN'S STATEMENT

IN his speech at the second ordinary general meeting of the British Broadcasting Co., Ltd., held in London on Thursday, July 16, Lord Gainford, chairman of the company, paid a great tribute to the Press. In this connection he said: "It would be a serious omission from this brief survey if I made no reference to the newspaper Press. While we may still have some differences of opinion, our relations have improved greatly during the past year. Many of the great newspapers recognise and support our ideals and standards. Nor could I forget our very good friends of the technical wireless Press, who stand by us as faithfully today as in the early period of doubt and uncertainty when they were almost our only auxiliaries."

Other items in the speech were:

"During the past year there had been an increase of 567,000 in the number of broadcast receiving licences issued throughout the country.

"The total receipts from the Postmaster-General for licences in two and a half years to the end of March, 1925, were £666,000.

"The total expenditure of the B.B.C. on programmes for the same period was £612,000.

The total receipts for the financial year ending March 31, 1925, were £538,528.

"The excess of revenue over expenditure, after deducting dividend for the same period, was approximately £79,000.

"Of expenditure, 85.37 per cent. was incurred on programmes, 6.38 per cent. was incurred on administration, and 8.25 per cent. was incurred on depreciation.

"The dividend charge under the statutory 7½ per cent. absorbed £5,172. The whole of the profits apart from this have been invested in necessary addition to plant as follows: £59,000 of the surplus has already been spent on extension and improvements; £50,000 is required to complete the construction of the Daventry station and to complete payments for the new London station in Oxford Street. These two items alone more than absorb the £79,000 excess of revenue over expenditure which appears in the balance-sheet.

"On a conservative basis it is estimated that ten million of the inhabitants of these islands listen to the B.B.C. programmes, either regularly or occasionally. In two years' time British broadcasting may well reach twenty million of the people of this country."

Regarding the future, Lord Gainford stated that the B.B.C. had in hand plans for rapid development on the present lines of activity, as well as plans for the introduction of new lines of activity. In this connection he indicated that if and when the number of licensed listeners increases to two million, the income will barely secure the standard of service at which the B.B.C. is aiming in its endeavour to provide the best available services for the whole of the population of the country.

Lord Gainford concluded as follows: "All the reliable evidence that we have at our disposal goes to prove that the public generally are satisfied with the manner in which we have sought to discharge the heavy responsibility committed to us, and that they appreciate the many difficulties encountered and overcome. We fully realise, however, that much lies ahead in every line, and we are determined to prosecute the developments of the service in the best interests of the whole country.

The Armstrong Circuit

SIR,—In a letter published in No. 163, "G. B. S." (West Ealing) criticises a super-regenerative circuit published in No. 161.

On his own Armstrong set he finds it "practically impossible to receive any but the local station," while the circuit which he criticises will bring in all main stations under fair conditions; in fact, the circuit which "G. B. S." derides is to all intents and purposes the same as the one used in the "All England on One Valve" receiver described in No. 4 of "The Wireless Magazine." "G. B. S." would be well advised to rewire his set to the circuit given in No. 161.—F. B. J. (London).

"Tuning with the Rheostats"

SIR,—With reference to the article published in No. 163 with the above title, it is, of course, admitted that the strength of signals can be controlled by the filament resistances: turn them on, the signals are loud, turn them off, and signals cease; but this is not "tuning."

By tuning is meant the adjusting of the natural frequency of the circuits to that of the incoming signals. Apparently "J. H. R." thinks the rheostats really do this. At any rate, he states that as the grid potential is varied by a movement of the rheostat there is an alteration in the plate-grid capacity, though he does not say why.

It will be obvious to most experimenters that the temperature of the filament, the grid voltage, or even the H.T. voltage, has nothing whatever to do with the plate-grid *capacity,* which is governed only by the size of the two electrodes mentioned and their distance apart.—C. M. (Cambridge).

Transformer Curves

SIR,—Many of the amplification curves of low-frequency transformers on the market do not give an adequate picture of the results.

Manufacturers of these transformers almost universally show the unique amplification qualities between frequencies of 300 and 4,000 cycles per second. The curve shown between these frequency limits usually presents a straight line free from kinks and sudden gradients.

When it is remembered, however, that the frequency of the middle C on the piano is 256 and that 4,000 is a little more than the octave above, it will be realised that these curves fall short of their proper purpose. What a shock it would be to those who consider transformer design has approximated to perfection if they could see the curve continued on one side to a frequency of 27, the bottom note of the piano.

A suggestion that has been put forward —I do not claim the origin—is to use an amplification curve obtained from the piano scale. With such a curve the voltage amplification would form the abscissa as before, and the ordinate would be marked off in evenly-spaced octaves of the piano. —STUDENT (Farnborough).

San Sebastian

SIR,—Radio San Sebastian has now a wavelength of 362 metres, within 2 metres either way (by buzzer wavemeter of low decrement), measured four times between 12 and 1 a.m. on the night of July 7, when the station was testing to London.—A. L. M. S. (London, W.C.).

A Complaint from Portsmouth

SIR,—I must thank you for helping me out of a little difficulty some time ago. Thanks to you, my set is now operating very satisfactorily. However, what I intended to write to you about is the fact that Portsmouth is one of the areas that is not altogether satisfactorily served by the B.B.C. Our nearest station is Bournemouth, about fifty miles away. London is eighty miles away. My own set has an H.F. amplifier, followed by crystal detector, and the loudest signals I ever receive are just audible with the phones held about twelve inches from the ears—a strength which, I believe, many crystal users get consistently in well-served areas. I should think that Portsmouth has a lower percentage of listeners than any other town on the south coast, chiefly because it is not in a crystal area. A nearer station would be a great asset not only to Portsmouth, but all towns to the east as well.—A. C. (Portsmouth).

Other Correspondence Summarised

A. Oldfield (Heaton Chapel, Post Office, nr. Stockport, Ches.) has numbers 130 to 160 of "A.W.," and will send them, on receipt of postage, to any reader desiring them.

E. P. E. (Finsbury Park) wishes to express his appreciation of the generous treatment he has received from the makers of Cossor valves. They replaced a faulty L.F. valve free of charge and without asking any questions.

J. R. (Wolverhampton) wishes to bring to readers' notice the kind treatment he has received from the Ashley Wireless Telephone Co. They repaired and returned within four days, and free of charge, a Claritone loud-speaker.

J. W. B. (North Shields) wishes to express his appreciation of the courtesy extended to him by Messrs. Metro-Vick Supplies, Ltd., when they promptly replaced an unsatisfactory dull-emitter valve.

G. B. (Blackheath) wishes to make known the straightforward treatment he has received from the Mullard Valve Co. They replaced a faulty H.F. valve which had been in use for about six months.

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TRADE NOTES AND CATALOGUES

"HOW to Get the Most Out of Your Radio Batteries" is the title of an interesting booklet we have received from J. R. Morris, of Imperial House, 15, Kingsway, W.

The St. Andrews and Kilmorie works of Alfred Graham and Co. will be entirely closed from 6 p.m. July 24 until 8 a.m. August 10 in view of the annual holidays. It is requested that orders may be placed in good time to ensure delivery, otherwise dispatch cannot be effected until the factory is reopened.

We have received from the General Radio Co., Ltd., of Radio House, 235, Regent Street, W.1, a photograph illustrating a demonstration suggestion for wireless traders.

A social gathering was given by Mrs. Raymond, of 7, Grape Street, Shaftesbury Avenue, on the occasion of the forthcoming marriage of Miss Everett to Mr. L. Fillimore, one of the partners of Jackson Bros. Miss Everett has been connected with Mrs. Raymond since the commencement of her career in the wireless trade.

Progress, the journal of the Royal Northern group of hospitals, has been received from the secretary of the Royal Northern Hospital, Holloway Road, N.7.

The Grafton Electric Co., of 54, Grafton Street, Tottenham Court Road, inform us that their complete catalogue will not be issued till the end of August, but that a leaflet dealing with goods of their own manufacture is at present obtainable.

Messrs. A. C. Cossor, Ltd., of Aberdeen Lane, Highbury Grove, N.5, have sent us No. 1 of a new monthly organ, *The Radio Mail*. This interesting magazine, we understand, is for distribution only among those interested in the sale of wireless material.

Coventry and District Co-operative Radio Society

Hon. Sec.—MR. A. CURTIS, West Orchard, Coventry. On July 1 Mr. Oscar, technical adviser to the society, gave demonstrations with wireless receivers, using a loud-speaker, and excellent results were obtained. The higher aerial which had been provided greatly improved reception.

Golders Green and Hendon Radio Society

Hon. Sec.—MR. W. J. T. CREWE, "The Dawn," 111, Prince's Park Avenue, N.W.11.

THE first of a series of informal meetings arranged for the months of July, August and September was held on July 1 with great success. Difficulties were discussed and suggestions for overcoming them put forward.

ANNOUNCEMENTS

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

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

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

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

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

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

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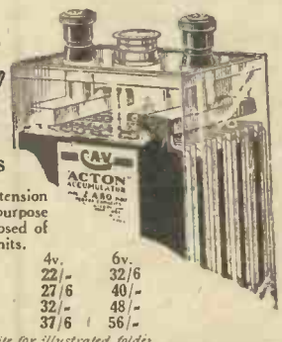

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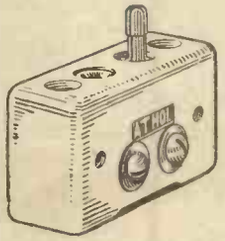

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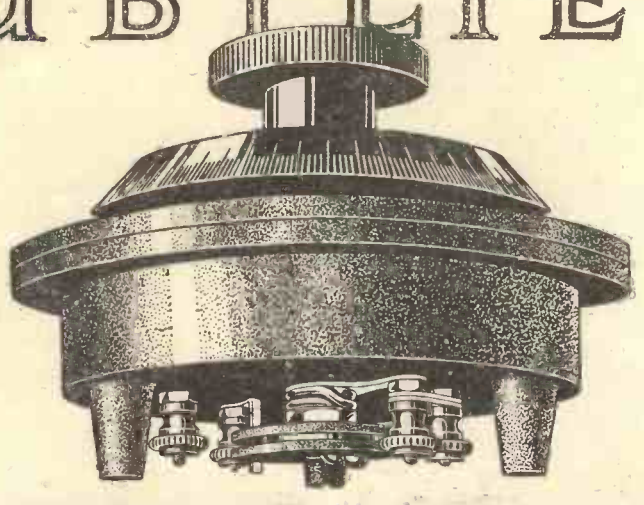

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E.P.S. 141

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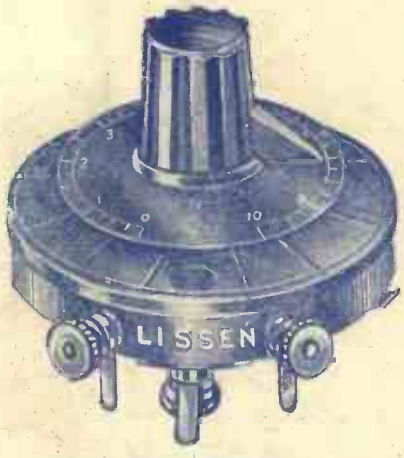

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THE LISSEN ROTARY POTENTIOMETER

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