

ANOTHER LINEN-DIAPHRAGM LOUD-SPEAKER

# Amateur Wireless

Every  
Thursday 3<sup>d</sup>

and  
Radiovision

Vol. XIV. No. 365

Saturday, June 8, 1929

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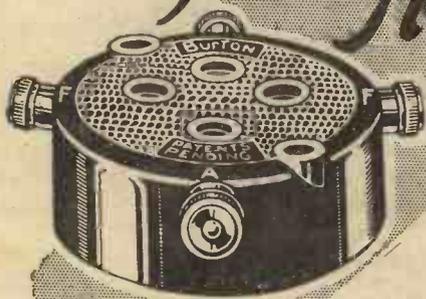
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# Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

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## Blowing its own Trumpet—"Swopping" Programmes—Music for the Mike!—Talkies Again!—Grammar, Please!—Listening for Fish!

**Blowing Its Own Trumpet**—A fact which is beginning to make itself even more painfully obvious than it was in the past year is the B.B.C.'s self-advertising. In saying this a casual "dig" is not being made, for many listeners complain that the constant repetition of what the B.B.C. does and can do, over the microphone, is wearisome. And yet the powers that be have seen cause to forbid the broadcasting of names of dance tunes! There would be some excuse for microphone self-advertisement if broadcasting were run on competitive lines; but as this is not the case why does the B.B.C. seek to make itself more than ever a monopoly?

**"Swopping" Programmes**—The recent visit of Mr. Aylesworth, who is President of the United States National Broadcasting Co., showed that our transatlantic cousins are very interested in the idea of occasionally "swopping" programmes with us. When Mr. Aylesworth returned to the States a number of Press reports were issued stating that he had been discussing plans in London, of a programme exchange scheme. It is probable that the new experimental station at Tatsfield may be used by the B.B.C. in connection with its part of the relay.

**Music for the Mike!**—Is this a record? Max Butting, a German composer with a fair reputation in his native country, has composed an orchestral work especially for broadcasting. It is understood that Butting is himself something of a technician and his musical composition is said to take into account present defects, both at the transmitter and in receivers. We have not yet heard the piece, but it is hard to see what he has done. Has he cut out the bass, used only instruments which broadcast well, or cramped his style in some similar way? But perhaps the B.B.C. will broadcast it and then we shall know.



Loud-speakers on board! The *Crested Eagle*, which makes trips from the Tower Pier to Margate and Ramsgate, is now fitted with a loud-speaking installation. At present the speakers are used only to broadcast accounts of the scenery passed en route, but music and concerts are later to be given.

**Talkies Again!**—Listeners seem to be likely to lose something by the advent of talkies, which are attracting (as has recently been pointed out in AMATEUR WIRELESS), a number of former members of the B.B.C. staff. Now here is a new hardship. Owing to the installation of talkies it is no longer possible to relay Frank Westfield's orchestra from the Prince

of Wales Playhouse, Lewisham. Unless the B.B.C. does something off its own bat we have probably heard the last over the microphone of this popular combination.

**Grammar, Please!**—The other day in a literary contemporary with which a well-known broadcaster is connected we came across that horrible grammatical error, or Americanism (whichever way you like to look at it!) "broadcasted." One would think that after all these years' experience of broadcasting the various tenses of the verb "to broadcast" would be common knowledge. True, it is rare that literary lights slip up on such subjects; but who would say "he *casted* a stone."

**Listening for Fish!**—The technical folk of the Marconi Co. seem to be adept at finding new uses for radio, one of the latest being in connection with the fishing fleet. A number of steam trawlers leading the fleet have been fitted out with radio and many of the boats carry two-valve receivers. Members of the fleet can communicate with one another up to a distance of about 300 miles and reports are constantly being received of the way in which a member of the fleet, finding good fishing ground, can ensure a good catch by summoning other boats.

**Yacht Radio**—Sir William Berry's famous motoring yacht *Sona* can now boast of one of the most up-to-date radio outfits. It has on board a four-valve broadcast receiver with loud-speakers arranged at various points and permanent wiring thereto. In addition there is a 1½ k.w. valve transmitter for long-distance communication.

**This Week**—In the centre pages of this issue you will find constructional details of another addition to the ranks of AMATEUR WIRELESS portables. This is the "Holiday Portable Three," which is designed to fill a very definite need.

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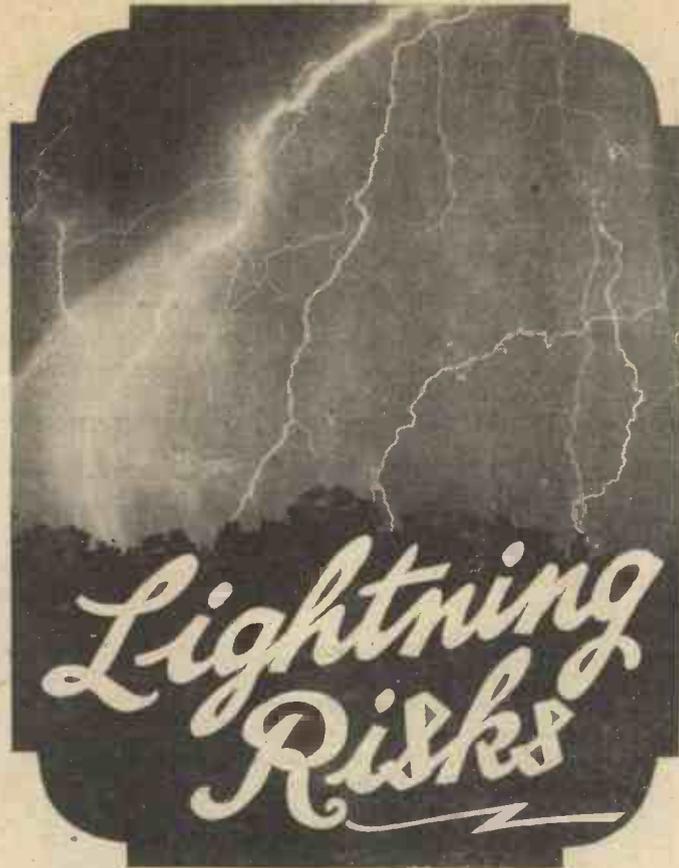
MANY cautious listeners use an outside earthing switch even when it entails having to go out into the open to switch off after listening to an evening's broadcast programme. Others whole-heartedly accept the risk involved in leaving the aerial unearthed.

Inside switches are most commonly used, though their effective value is more moral than actual should lightning ever make a direct hit on the aerial. The proper solution is, of course, to use an outside switch arranged to be operated from inside, of which there are a number of types available.

The principle employed is to make the conducting rod slideable to a limited extent through the vulcanite lead-in tube. A knob or handle at the inside end of the rod then enables the listener to slide the rod so as to open and close switch contacts at one or both ends of the rod.

In one position the aerial wire is connected directly to an earth wire and in the other position the aerial has no direct earth connection, but is connected through the lead-in tube to the receiving set. The position and shape of the switch contact varies in different designs.

In making a selection from these, care should be taken to note the following points: In the first place, the direct aerial-to-earth path when the switch is in the "off" position should be as straight as possible, as any sharp bends or curves in



the conducting path would render the arrangement practically useless in the case of a direct hit. Good contact in this part of the switch is a minor consideration so long as the path is straight.

In the next place, the switch contact connecting the aerial to the set must give good contact, preferably a rubbing contact under spring pressure, as this will keep

the surfaces bright. In some designs this switch contact is omitted altogether, the aerial being permanently connected, either by screw terminals or soldered joints, to the inside wire leading to the aerial terminal of the set.

This prevents any loss of signal strength due to high resistance at the switch contacts, but, on the other hand, it leaves the aerial connected to the set even when the set is not in use and the aerial is earthed.

This may not recommend itself to listeners who are inclined to nervousness, as they may argue that no leads entering the house should be connected to the aerial when the set is switched off. There is little ground for fear, however, as the main discharge would almost certainly take the straight path to earth and ignore the high-resistance shunt through the set.

There still remains the possibility of a lightning discharge when the set is in use. The usual protection against this is to provide a small air gap between the down lead and the earth connection. Any heavy discharge

will pass across the gap in preference to following the indirect path through the set.

Even where there is no special provision made for a special spark gap the small gap normally existing between the aerial and earth switch contacts, when these are open, would in most cases serve as a safeguard.

M. A. L.

## SECRET WIRELESS

THE latest methods for keeping wireless signals secret are quite sufficient to launt the most enthusiastic listener, quite apart from the recent official prohibition on the subject by the P.M.G. The object in view is, of course, to place commercial wireless telephony on an equal footing with the ordinary telephone service as regards immunity from unauthorized eavesdropping.

In one system that has recently been proposed, the voice currents, as spoken into the land-line leading to the wireless transmitter, are first divided up into three different bands of frequency, by means of filter circuits. These bands are then transposed and recombined in a definite sequence so as to bear no resemblance whatever to intelligible speech. They are then imposed on a carrier wave and transmitted over the ether in this form.

At the distant end, the signals are detected, and split up again into the three original frequency bands. These are then

reshuffled into their proper sequence before being fed to the telephone. In this way a spoken message can be kept absolutely inviolable in its passage across the ether.

B. A. R.

## MAINS-ELIMINATOR HUM

THE recognised method for removing any trace of "hum" due to the A.C. component or ripple from the electric-light supply consists in the use of filter circuits comprising inductances or chokes in series with the supply, and condensers in parallel. The problem is now, however, being tackled on new lines which may render the use of such filters unnecessary. Broadly speaking, the new method consists in diverting part of the ripple or A.C. voltage fluctuations on to the grid of the amplifier, in phase opposition with the residual ripple voltage between the plate and filament. The valve thus automatically neutralises the initial disturbance in much the same fashion as in the well-known balancing methods used for stabilising H.F. amplifiers.

M. B.

## CIRCULARLY - POLARISED WAVES

IT has been found that waves of 400 metres length when received after reflection from the Heaviside layer often have circularly-polarised components. That is to say, the electric and magnetic fields remain constant in amplitude, but rotate at a constant speed about the path of travel. The direction of rotation is anti-clockwise. The effect has been attributed to the action of the earth's magnetic field, in which case the rotation should be clockwise in the Southern Hemisphere.

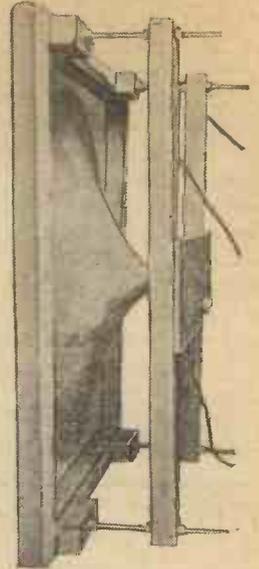
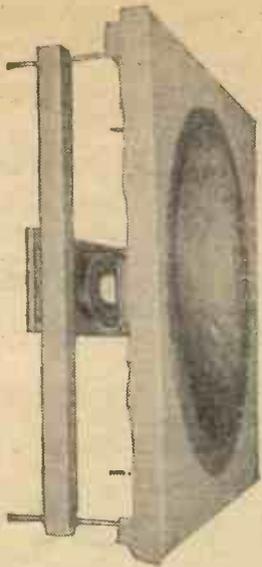
On shorter waves, under similar circumstances, the waves are plane polarised, but the actual plane of polarisation rotates slowly, making a complete cycle every few seconds. Such waves if received on an upright aerial "fade" periodically. This defect can, however, be overcome by receiving the signals simultaneously on vertical and horizontal aerials spaced a few wavelengths apart and connected to a common receiver.

A. H.

# THE MONO-CONE LINEN-DIAPHRAGM SPEAKER

*Constructional Details of a New Type of Instrument*

By G. M. GREEN, M.Sc. and B. THOMPSON, B.Sc.



**D**URING the past few years the cone type of speaker has become increasingly popular and deservedly so. Many cones however have a tendency to reproduce the lower register better than the higher, this failing being by no means entirely due to inherent faults in reed movements, and very much that passes a non-critical ear as "bass" is really false resonance or booming.

In the single-cone linen-diaphragm speaker to be described, which the authors have named the "Ianora," the reproduction of all frequencies is very uniform, this being due in a large measure to the method of floating the cone, the nature of the material, and the kind of dope.

False resonance is entirely eliminated, whilst the reproduction is extremely good, and will probably come as a revelation to constructors.

Briefly, the diaphragm consists of a cone of rather large diameter made of a fabric known as Dorcas Lawn Permanent. This is doped to give it the necessary stiffness—this point is vitally important if the best results are to be obtained—and floated on the same material, not doped. The cone and the floating medium are made from the same square of cloth, thus giving perfect continuity.

The construction of the speaker is perfectly simple and straightforward, but the utmost care must be taken in following out the instructions, otherwise the results will not be guaranteed.

The following materials will be required to make the speaker:—  
 3/4 yd. Dorcas Lawn Permanent.  
 10 ft. 7/8 cross section wood.  
 1 strip five-ply, 12 in. by 3 1/2 in.  
 2 ft. No. 2 B.A. screwed brass rod.  
 16 nuts and washers to fit brass rod.  
 Balanced-armature unit (Blue Spot 66K).  
 1 cone washer assembly unit.  
 Screws, tacks, glue, dope.

**Making the Cone and Float**

Cut out a square of Dorcas Lawn Permanent (this material is specially recommended as giving the best results, several other kinds of standardised fabrics having been tried and found very much wanting by comparison) having sides 27 in. long. Wash thoroughly to remove any sizing; dry, and iron out any creases.

Place on a flat board, fastening down with drawing pins, and draw a circle of 8-in. radius (diameter 16 in.) in the centre. The compass should be fitted with a piece of indelible pencil, since the line representing the edge of the area to be doped must be clearly seen.

and a dotted or interrupted line with a radius of 4 3/8 in. On the bottom line construct a dotted-line semicircle of 4 in. radius and a thick-line semicircle with a radius of 4 3/8 in. See sketch on next page. Note that the lower thick line stops short where it reaches the upper line.

When the cloth is doped sufficiently as to be stiff, the scissors are taken along the thick lines to the centre of the circle, thus cutting out a moon-shaped portion.

**Doping the Material**

The authors have used various kinds of advertised dopes or varnishes in their experiments, but found that the one recommended gives the best results.

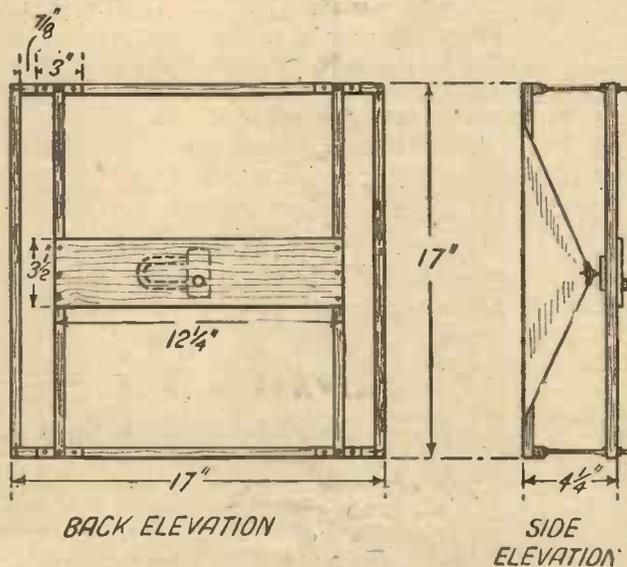
Dissolve in one-third of a pint of acetone, with repeated stirring and shaking, as much celluloid as will give a solution as thick as golden syrup. The price of this acetone is about 2s. The celluloid from a discarded accumulator will answer. This quantity of dope is sufficient to give the four coatings recommended.

In applying the coats of dope, keep the fabric stretched on the board and work from the circumference inwards, taking care not to overstep the boundary. Use a soft brush.

When the whole surface has received its coat, remove the linen from the board and hang up to dry. This is complete in an hour or less.

Return to board and dope for a second time on the reverse side. Remove and dry. After doping for the third coating—this time on the front side—and drying, the stiffened diaphragm is ready to have its moon-shaped sector cut out, so that the cone may be shaped and glued up.

At this stage it is strongly recommended to practise the complete operation of



Elevation and Section of the Speaker Frame

Now draw a horizontal line from centre to circumference on the right of the circle. Draw another line below this inclined at an angle of 30 degrees. To do this, stretch the compasses to a width of 4 in. and mark off this distance on the circumference below the horizontal line. Join this point to the centre of the circle. Now find the middle point of each line. On the top line draw a thick-line semicircle with a radius of 4 in.

folding and gluing up a circular sheet of ordinary stiff notepaper.

When the cone is being formed see that the dotted lines and the two edges of the cut-out sector coincide with each other. Use a thin layer of fairly stiff glue (not Seccotine) for fastening the overlap down, and work in easy stages from the centre of the cone to the edge. It will be observed that a fold in the cloth occurs and that the square of cloth loses its shape. This fold can be nicely arranged later on the frame and plenty of cloth remains for securing purposes.

### Fixing to the Frame

The frame, which supports the cone and

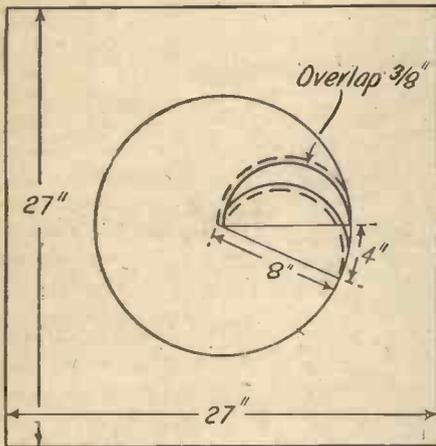


Diagram showing method of cutting diaphragm

is float, is made from four lengths of  $\frac{3}{8}$ -in. square-section wood,  $16\frac{1}{8}$  in. long. If these are screwed down to each other, as in the diagram, the result is a square of great rigidity. No angle plates are required.

Lay the cone and the undoped fabric on a flat board and place the frame down over it. Pull the fabric into position so that the doped cone lies symmetrically in the centre of the frame. Fold up the surplus fabric and tack down to the back of the frame

with  $\frac{1}{2}$ -in. tacks. By tacking opposite sides alternately and working from the centre of each side outwards with a judicious pull on the fabric here and there, the result is a fairly respectable-looking cone floating on a slightly stretched creaseless square of undoped fabric.

Now punch a small hole in the apex of the cone and fit the cone washer assembly unit. The authors use one in which the spindle of the cone unit has to be held in position by a small screw from the side.

At this stage it is necessary to pull the cone into its final shape. This is done by passing a thin string through the cone washer unit, fastening one end to a small screw and the other to a weight of three or four pounds. Rest the frame between the edges of two chairs and give the cone a last but generous coat of dope. The wet material under the influence of the weight below takes on a better shape. Do not worry if the diaphragm when dry is not regularly conical from circumference to tip.

All that now remains is to connect up the cone unit. Saw off four 3-in. lengths of the  $\frac{7}{8}$ -in. section wood. In the centre of each bore a hole to take the 6-in. length of 2 B.A. brass rod. Countersink deeply on the side that is to lie on the frame so as to take a nut without any part projecting and fasten the rod securely by means of a nut and washer on the opposite side. Screw each one down to the back of the frame by  $1\frac{1}{2}$ -in. screws in the positions indicated in the sketch.

Take two lengths of  $\frac{7}{8}$ -in. wood, 17 in. in length and bore holes at the top and bottom slightly bigger than the diameter of the brass rod in the positions which will be found by resting the wood on the brass rod ends, the ends of the wood being flush with the edges of the frame. Use five-ply wood  $3\frac{1}{2}$  in. wide to take the Blue Spot unit. Its length might be a little more than the sketch would indicate to allow for any adjustments.

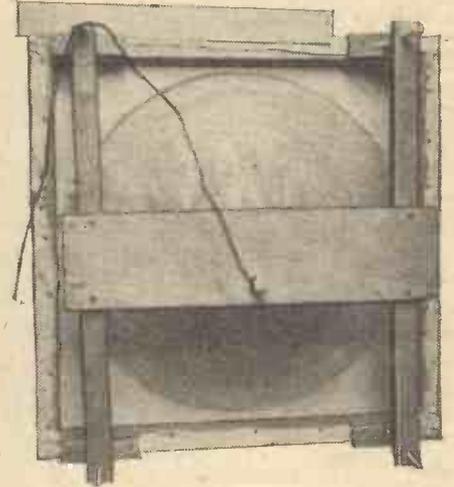
In attaching to the cone see that the latter travels freely along the spindle of

the unit on slight compression. Do not pass the spindle through the washer unit so as to have any part projecting unless your cone washer assembly unit necessitates the use of securing nuts.

### The Merits of the Single-cone Speaker

It is necessary to assume that a good three-valve set (such as H.F., det., power valve) is being used to provide the impulses. Under these circumstances the authors guarantee the following:—

- (1) Speech is extremely clear and very natural.
- (2) Music is well and truly rendered in the bass, middle register and the treble. In the bass the notes of the tympani or



A rear view of the speaker

drums may be clearly identified. There is an entire absence of false resonance or booming in the lower register.

- (3) The volume obtainable is surprising.
- (4) The instrument will stand up to very strong signals without any signs of distress.
- (5) Slightly improved results will be gained by surrounding the speaker with a baffle in the shape of an open-backed cabinet just made to fit it, the front being fretted.

## BUENOS AIRES CALLING!

JOTTINGS FROM MY LOG :: BY JAY COOTE

IT was just luck which prompted me to tune in to Radio Paris at about 6.20 p.m. on Saturday, May 25, when, much to my surprise, I heard an announcement in Spanish. Such an unusual occurrence demanded investigation, and without delay I made a rapid search, with the result that I discovered that the day was a national fête in the Argentine Republic, and that on this auspicious occasion one of the principal Buenos Aires broadcasters—LR4, if I heard the call rightly—was transmitting a special concert for the benefit of the two American continents and Europe.

Now, when after listening to a gramophone record—an obvious test—I was told, in Spanish, English, French, and German,

to stand by, I did so, and was duly rewarded. At 6.35 p.m. Radio Splendid, Buenos Aires, the station in question, put over the Argentine National Anthem, and followed it up with short talks in all four languages, which put me wise to the route by which I was receiving the concert. Apparently, by previous arrangement, Radio Paris was taking it from the short-wave transmitter of Ste. Assise (France), which in its turn picked it up from Monte Grande (Buenos Aires). Simultaneously, as I quickly discovered, Nauen (Germany) was capturing it from the same source, and passing it on to Berlin and Königswusterhausen, the latter, curiously enough, giving me, notwithstanding its greater distance

from London, a much clearer and purer relay than did the Paris station.

Many will recall the transatlantic relays effected by our own home stations—some successful, some not—and also the poor result achieved when we tried to reach out to the Antipodes. In the Buenos Aires transmission, Monte Grande, in conjunction with Nauen and Ste. Assise, scored heavily, for it proved a perfect success. No fading was noticed, distortion was remarkable by its absence, and fortunately, notwithstanding thundery weather conditions, atmospheric caused but little interference. Bear in mind that this took place in full sunshine on a day when, to all appearances, reception should have been poor.

# Checking the Changing Currents

*The whole Science of Wireless Telephony depends upon Changing Currents. Our Technical Editor here discusses the various forms of Current and shows how their action may be checked up by actual inspection*

**R**ADIO engineering is built up on the use of alternating currents. We start by generating current which alternates at some millions of times per second. This current is caused to run up and down a vertical wire known as an aerial in consequence of which it causes disturbances in the ether which travel outwards in all directions, unless, as in the case of a beam system, they are restricted to a certain direction only. These disturbances we call wireless waves and at the receiving point we set up a collecting system in which oscillating currents are induced similar to those at the transmitting end.

## A.C. Currents

Thus, in the first place, the whole mechanism by which we transmit energy from point to point by wireless is based upon the production and utilisation of alternating currents, that is to say, currents which go first in one direction and then in the other. In wireless telephony, however, we go farther than this, because we modulate the alternating currents in the transmitter with low-frequency speech currents and in consequence we receive similarly modulated currents at the distant end. Here again, we have introduced fluctuating currents of an entirely different order of frequency, the rate of vibration here varying from some 50 cycles per second up to 6,000 or 8,000.

Still lower down in the scale we come across power frequencies, for the electric lighting current which is often used to supply some or all of the voltages necessary for operating the transmitter or receiver is

often alternating in character, the frequency here being anything from 25 to 50 as a general rule. In America 60 cycles is the standard frequency while some districts in this country have some freak periodicity, such as 93 cycles, but the generally accepted standard is 50.

It is because of the varying nature of these currents that we are able to do such extraordinary things with them. Direct current—that is to say, current produced by a steady source and flowing through a steady resistance—is a more or less uninspiring form of electricity. The current is directly proportional to the voltage applied and indirectly proportional to the resistance and this is practically all that can be said about it. As soon as one commences to vary the current, however, all sorts of effects come into play. We have to consider, for example, the inductive effect of the circuit. If the wire encloses any area we have an inductive effect which cuts down the current. We can make alternating currents flow in paths which direct current will not take any notice of. Thus, two pieces of metal separated by an insulator constitute a path to alternating current, for such an arrangement acts as a condenser and will charge and discharge in harmony with the variations of voltage applied to it.

## Many Considerations

Not only have we to consider numerous effects which do not come into play with a steady current at all, but we have also to consider the extent to which the various properties of the circuit affect the current. For example, a circuit which is designed to

give a certain result at a low frequency, such as would be used for a power transmission, would give entirely different results if it were supplied with radio frequency. A single turn of wire would have very little effect on a power frequency current where as at a radio frequency its presence would be quite appreciable. Again we all know the distressing trouble known as "hand effect." The presence of one's body capacity is sufficient to cause a leakage of current from the circuit in question to earth and

particularly on very short waves, which operate at extremely high frequencies, the whole operation of the circuit may be changed by coming near to, or farther away from, the apparatus. At a power frequency on the other hand, no such effects are experienced, for although the capacity effect is still there, the frequency of the current is too low to take any account of such a path.

## Voltage Variations

These are some of the simple effects arising from the use of alternating currents, and it is quite an easy matter to calculate the currents which will flow in various classes of circuit when an alternating voltage which is constant in its effective value is applied across the terminals. An alternating voltage can never be constant in the same sense as a direct current can, but it is possible for the variations in the voltage or current to take place at regular intervals and to go through the same changes so that the form of any one "cycle," as it is called, is an exact duplicate of that immediately preceding it. There are, however, many cases which arise in scientific practice much more complicated than a simple case of this nature.

When one speaks into a microphone, sound waves are converted into electrical currents which must vary in an identical manner, as far as we can arrange it, and the whole question of natural reproduction depends essentially upon these small points. When one begins to work out the theory of such variations as this, the matter becomes distinctly more complicated. Indeed, there are some aspects of the question about which we have not yet obtained enough information to enable us to theorise with any degree of certainty. The principal test of the correctness of any theory is whether it enables one to produce the desired results in practice, and in many cases we fall short of this because we have not sufficient information to work upon.

There are cases, however, where we can assist our theory or gain further knowledge on any given problem by arranging in some manner to observe the form of the current in a circuit. Not only does this enable us to verify our theoretical ideas, but it may lead to the discovery of unsuspected effects.

To take a very simple example we assume that an alternating current varies in a certain defined manner and if we do certain things to the circuit, the current will change and it may be that the wave form will alter. That is to say, the manner in which the current varies may change from

*(Continued in 3rd col. of next page)*



**THE MICROPHONE FOR SHOP-WINDOW DEMONSTRATIONS**  
The window of a London store in which the demonstrator speaks into the microphone. The crowd outside listen to the voice via the loud-speaker.

# MY WIRELESS

Weekly Tips,  
Constructional  
and  
Theoretical—



# DEN

By  
W. JAMES

For the  
Wireless  
Amateur

## A Puzzle

A SHORT while ago I was asked to try a receiver of the three-valve type, having a shielded grid high-frequency stage, because magnification was poor and the tuning was rather broad. I will not describe the tests which were made in order to determine the cause of the trouble, but, having found that the coils, condensers, and valves were in order and having fitted new valve holders, the receiver functioned normally.

It was the valve holders which were reducing the magnification of the original set and making the tuning broad. They were of an old pattern, the insulating material of which was defective. There was no actual leakage between the valve terminals, but the material was so poor that they in effect acted as resistances across the circuits.

Tests on a number of valve holders have shown me that the differences as between one type and another are sufficient to account for noticeable differences in the behaviour of receivers.

## One-knob Control

I think it is generally realised that in order to obtain sharp tuning without introducing distortion it is advisable to rely upon a number of tuned circuits, each of which tunes relatively broadly, than upon one or two sharply tuned circuits and reaction.

This is because the combined effect of several circuits that may individually tune rather broadly is to pass a band of frequencies more or less equally well. The band in telephony is from 15,000 to 20,000 cycles wide, and an object of a designer would be to pass the whole band and to stop currents having frequencies outside this band. Unfortunately, it is rather troublesome having to tune so many circuits unless a multiple condenser is employed to tune them all, when the circuits have to be fairly closely matched. But given good coils and a suitable layout, it is found that by providing properly constructed condensers or, alternatively, condensers that may be adjusted after the set is assembled, it is a practicable proposition to employ a one-knob control.

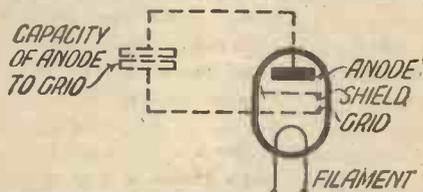
Some of the multiple condensers are therefore fitted with vernier condensers or

have a loose plate in order that the circuits may be put into tune with ease when the construction is complete. As one would expect, the individual condenser adjustment can only compensate for the initial variations in the circuit capacity. This adjustment cannot correct for inductance differences.

## S.G. Valve Capacity

On former occasions I have pointed out that, in spite of its special construction, there is still sufficient capacity between the grid and the anode of a shielded valve to cause trouble. The capacity is indicated below, and although it is very small indeed in comparison with that of ordinary valves it cannot be neglected.

It is this capacity which will cause a high-frequency amplifier to oscillate when good tuning coils are used, even though the anode and grid circuits are completely



Where there are inter-electrode capacities in a screen-grid valve

screened and the various de-coupling filters are employed. This capacity effectively limits the amount of the magnification that can be obtained with stability, and failure to recognise this has in the past resulted in an amount of trouble.

Before the valve capacity is reckoned to be the principal cause of instability, however, all other stray couplings must be minimised by suitable shielding and circuit connections.

## Finding a Good H.F. Choke

There are so many types of high-frequency choking coils available to-day that the ordinary reader may well wonder whether it is possible to distinguish between a good and a poor one by inspection or other simple means.

These choking coils vary greatly in their size and in the amount of the wire used in their construction. Some of them comprise a former of cylindrical shape, but

others are conical or, at all events, smaller at one end than the other. Most of them are section wound, and, as one would expect, the more expensive ones are larger and have more wire in them than cheaper types.

From my experience of many types, I should say that when the choking coil is to be used in the anode circuit of a detector valve and really good high-frequency choking is required, the amount of the wire used is a fair guide regarding merit. Small choking coils having comparatively few turns of thick wire cannot in the nature of things be quite so effective over as wide a range as larger, well-constructed coils wound with many more turns of finer wire.

## "CHECKING THE CHANGING CURRENTS"

(Continued from preceding page)

a substantially regular formation to some irregular but still symmetrical form.

Under certain conditions, we are able to verify whether this is so, by causing the current to trace out for us a picture of itself. Such a device is known as an oscillograph, and it virtually enables us to watch the current itself. The essential parts of an oscillograph are simple. We have, first of all, a device producing a small spot of light. This may be a mirror on to which we throw rays from a source and which reflects a tiny beam of light on to a suitable screen. Another way of producing a light spot is to set up a stream of electrons moving at a high velocity, which may be done by making use of the same principles as are utilised in an ordinary valve. By arranging in the path of these electrons a screen covered with fluorescent material, we can arrange to observe the pencil, for at the point where it strikes, the screen will glow slightly and we shall have a small spot of light.

The next procedure is to cause this spot of light to move about the screen under the control of the current which we wish to observe and if we can do this in a satisfactory manner it will tell us exactly how the current has varied during the time we have been examining it. I propose to show how this is done in next week's article, when I shall talk about two types of oscillograph which are commonly used to-day.

# On Your Wavelength!

## An Empire Broadcast

ONE of the most general broadcasts ever made took place on the evening of Friday, May 24, when the service and the speech made by the Prime Minister at the great Empire Day Festival in Hyde Park were relayed to the world from 5SW. I have pointed out in the past what a wonderful part wireless was bound to play in strengthening the bonds of Empire, and this is a fine example of what it can do. Reports show that the transmission was well received in many parts of the Empire and that it was thoroughly appreciated. Myself, I regard 5SW as one of our most important broadcasting stations, for the very reason that it transmits Imperially. I hope that more and more use may be made of its splendid possibilities.

## Missed Opportunities

For some reason that I have never been able to fathom, 5SW is not given a chance of doing more than a fraction of the good that it might. The station is in operation from Monday until Friday between 12.30 and 1.30 p.m. and between 7 p.m. and midnight, but that is all. On Saturdays and Sundays it is silent, though these days are almost as much a time of rest with golden opportunities for using the short-wave set in the Dominions and Colonies as they are in the Mother Country. Worse still, the news bulletins are not sent out from our short-wave station. The dweller in far-off places delights to hear the voices of the announcers and the music that comes to him from the B.B.C. studios; but what, above all things, he does want is news from home, and this is exactly what he does not get. Sad though it is to think of, he must rely for his news upon American short-wave stations such as W2XO, W8XK, and W2XAF. I maintain that it is the moral duty of the B.B.C.—which, after all, is now a Government department—to relay every portion of the London programmes throughout the day from 5SW and, above all things, to send out the news bulletins. There should, I think, be also special news bulletins of considerable length sent at various times during the day specially for those whose wireless sets provide them with the only link with the Mother Country.

## No Longer Experimental

If you remember, the B.B.C. could not be persuaded to start a short-wave station until public opinion had brought considerable pressure to bear upon it. When the station was opened the B.B.C. took every opportunity of pointing out that it was purely experimental; that perfect reception at vast distances could not yet be guaranteed

on the short waves, and so on and so on. But short-wave transmissions can no longer be regarded as mere experiments. The Dutch stations at Bandoeng, in Java, and the various American short-wave transmitters have proved to the hilt that, though occasional bad nights or even bad periods must be expected, a pretty useful service of news and entertainment can be guaranteed at ranges of thousands of miles in normal circumstances.

## Quality Not Necessary

The short-wave man living in some remote country of the Empire does not demand super-quality reception of the type that we associate with banks of L.S.'s and moving-coil loud-speakers. What he wants is to be able to put on his telephones when he has half an hour to spare and to hear what is going on in the big world. The American short-wave services, besides being regular and good, are at work for many hours on every one of the seven days of the week. Surely it is not too much to ask that our own short-wave station should do as much for countless thousands of British subjects.

## Last-minute Hitches

One had hoped that we had come to the end of the "episodes" between those responsible for musical entertainments of one kind or another and the B.B.C. Few things are more disappointing than a last-minute hitch, as occurred recently. Act III of Wagner's *Die Walküre* was down to be relayed from the Opera House at Covent Garden. This being something of an event, I—like many others, no doubt—had invited a party of musical friends to come in and enjoy the transmission. At the very last moment it was discovered that the opera could not be given over the wireless. Let it be understood clearly that the B.B.C. was in no way to blame. The whole thing was apparently cut and dried, and it was not until that very evening that the Opera House authorities informed the B.B.C. that the relay would not take place. The explanation is that some singer taking part in the opera had in his or her contract a clause which barred broadcasting. Surely this could have been discovered earlier by the opera people; or might not the part have been taken by another artiste? Happenings of this kind are pretty hard on listeners.

## A Wonderful Picture Feat

The Berlin newspapers published the other day a picture of the scene of the appalling hospital disaster at Cleveland, Ohio, U.S.A. The story of the journey made by this picture from Cincinnati to

Berlin is one of the most astonishing that I have come across in all the years that I have been connected with wireless. From Cincinnati to New York it was sent by an American picture system over the land line, the distance being something over 400 miles. Having reached New York it was handed over to the beam service people, who sent it to this country by radio, using the Marconi picture system, which is completely different from that employed for the first stage of the journey. From London it was sent six hundred odd miles to Berlin, over the submarine cable and the land telephone line, by the Fultograph system. And the wonderful part of it all is that it arrived in the German capital in so good a state that it could be used as a newspaper illustration!

## Well Done!

Just think what this means. First of all, three different vehicles were used: the land line, the cable, and the beam. Secondly, no less than three entirely distinct systems of picture transmission were called upon to deal with the photograph in turn. To transmit an original photograph from point to point is a sufficiently remarkable feat. To re-transmit successfully a picture which has already made one journey is still more wonderful. To send through six hundred miles of cable and wire a picture which has already made two long journeys, and to do it so well that a recognisable print is received, is a performance that simply leaves one gasping.

## Heat-wave Effects

It was only to be expected that the sudden big rise in temperature which occurred in the last third of the month of May should have considerable effects upon wireless reception. Until the warm weather came, long-distance reception had been phenomenally good for the time of year. Then quite suddenly even the biggest Continental stations began to go on just anyhow. On one night one could hardly hear a sound from some of them, whilst others came in with a roar. On the next those that were still small voices on the previous evening might have developed unexpected strength, whilst the ones that had been heard so well now needed quite a lot of reaction to bring them in at all. Such conditions, fortunately, seldom last for long, and I don't think that it will be many days before matters settle down. There are signs of an improvement at present so far as signal strength is concerned, though the thundery weather that has prevailed has made atmospheric rather a nuisance at times.

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## On Your Wavelength! (continued)

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### The Undying Joke

From the May issue of one of the American publications devoted to broadcasting I learn that the funny man in a certain concert party is having a great success with "the latest radio joke." It appears that he has a little love scene with the soprano, in which he begs her to marry him and become his loud-speaker. The "latest radio joke," which was originally cracked in one of the earliest issues of AMATEUR WIRELESS, seems to be a genuine evergreen. I fully expect that the "talkies" will give it a new lease of life.

### What the Sun Did

Strolling along to the Furzehill Laboratories the other day, I was astonished to find Mr. Reyner considerably perturbed. Upon inquiring the reason, I was handed two gadgets, one of which was an attractive looking thermal milliammeter and the other a glass bulb affair which I managed to recognise as a thermo-couple. I knew that this class of instrument, which is for measuring very small high-frequency currents, was often in use at the laboratories, but I did not quite see the significance in having them pushed at me in this manner, until it was explained that they had both given up the ghost in a quiet and refined manner during the holidays.

The reason for this was apparently that they had inadvertently been left in circuit on a bench, and that during certain parts of the day the said bench is flooded with rays from that great luminary the sun. Now, a thermo-couple or a thermal instrument works by virtue of the heat produced by the passage of the current through a very fine wire. This heat itself is not very great, and is, indeed, quite comparable with the heat of the sun. What had happened was that the strong rays from the sun had heated up the whole apparatus to such a point that the filament had burnt out.

Mr. Reyner told me that he was quite aware that the sun's rays would invalidate a reading being taken on either of the two instruments, due to the heating effect which added itself to the heating effect produced by the current to be measured. During any actual experiments it was necessary to shield the instrument from the direct rays of the sun, but he said that he had never come across an instance such as this, where the sun's rays had been sufficiently powerful to burn out the thermo-couple. I gathered that the actual damage was assessed in the neighbourhood of £5, which, as he said rather ruefully, was an expensive experience.

### Success at Last

This morning's post has brought me a triumphant letter from the friend who has

been trying so long and so hard to get down to 5 metres. He has succeeded, at long last, and after terrific work, in constructing a set that gives fine results from 5 to 5.4 metres. Not a very wide band of wavelengths, you may say. Just work it out in frequencies. His aerial coil consists of one turn of  $\frac{1}{8}$ -in. copper wire  $1\frac{3}{4}$  in. in diameter and reaction is produced by a coil  $\frac{3}{4}$  in. in diameter, containing six turns of No. 24 d.c.c. The grid is tuned by a minute variable condenser, whilst another of rather larger size controls reaction. The valve is a DE5, with its cap removed. There is no doubt that the short waves offer a very interesting field for the experimenter, for their possibilities have by no means been fully explored. Many amateurs are taking up this ultra-short wave work just now, and we may expect reports of some remarkable achievements. WGY, by the way, occasionally conducts a relay of his programme on about 5 metres.

### Temporary Insanity!

The other day I decided to make certain alterations in the layout of the detector part of my long-range receiver in order to obtain rather better spacing of the components. Amongst other things, the valve holder had to be moved, and whilst the fitting-in part of the proceedings was going on I had to have a valve in it to see that I was allowing plenty of room all round. Naturally, I removed my pet detector valve and put in the holder an old "dud," which would not be harmed if one did accidentally drop a heavy tool upon it. The alterations having been finished, I tried out the set, obtaining heaps and heaps of complete silence. Must have made a wrong connection somewhere, thinks I, proceeding to de-wire the batteries and to make a further examination of the set's interior. There was absolutely nothing wrong with the wiring. Mystery. A fresh trial. More silence. Yes, dear reader, I had left the old "dud" valve in the detector holder, and it was quite a long time before it dawned on me that its presence was responsible for that horrid silence.

### A Queer Coincidence

Chatting with a fellow-enthusiast the other day, I mentioned that I had just come across a rather unusual fault in a set brought round to me to examine by its perplexed owner. The reason why the thing would not work was found at length to be a breakage between one of the valve legs of one holder and its terminal. The holder was of the springy type, and as the said connection was underneath it could not, of course, be seen until the valve holder was removed and turned upside down for inspection. "That's funny," said the friend: "I had exactly the same

thing on the very same day in a set brought to me by a fellow. Which valve was yours?" I told him that it was the detector. "So was mine!" he said. The strange part of it is that I can only remember on one previous occasion having come across such a thing, and my friend had never had a case before. Funny—isn't it?—that we should both have struck the same thing in other people's sets on the same day.

### A Noble Earth

I have just installed an earth connection of which I am more than a little proud. I used to swear by the 7-lb. biscuit tin buried as near the bowels of the earth as might be before blistered hands and an aching back proclaimed that the hole was deep enough. But the worst of biscuit tins and such like is that, in some soils at any rate, they don't last very long.

### Making All Ship-shape

Here is the way in which I have dealt with my new earth plate. The plate itself is a piece of sheet copper measuring three feet in length by one foot in breadth, which is buried vertically, its top being about a foot below the surface. Its lower half rests in what I can certify to be real genuine clay. The earth wire is not a wire at all, but a piece of copper strip  $\frac{3}{4}$ -in. in width, insulated at its upper end by winding it with rubber tape. It is not soldered to the plate, but is firmly fixed, with copper rivets. When I came to try out the new earth I found that it gave distinctly better results than the old, there being a noticeable increase in signal strength from weak and distant stations. An earth of this kind does not cost much to construct, and I believe that it is well worth the trouble.

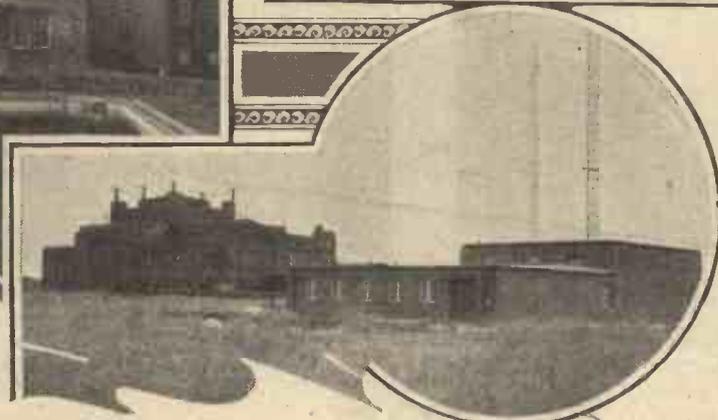
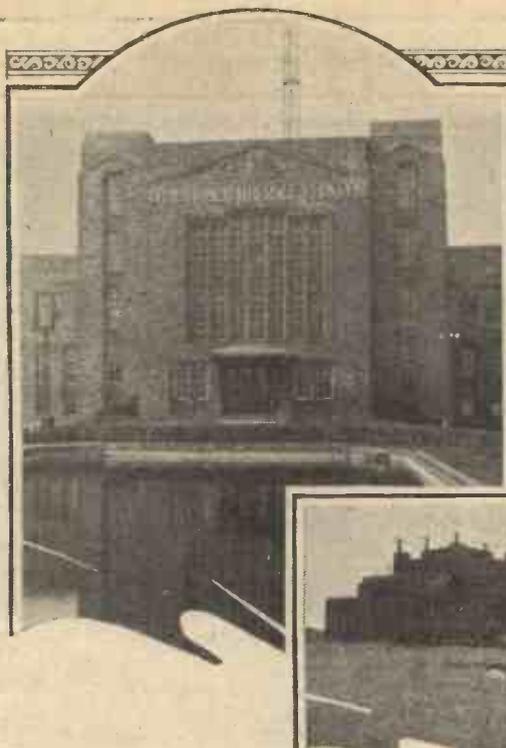
### Neat Condensers

One of the problems facing the set designer when he wants to make a compact piece of receiving apparatus used to be that of fitting in the variable condensers, for these had a way of requiring an unconscionable amount of space behind the panels. I am very much impressed with some of the neat little condensers that are being turned out nowadays. A pair of .0005-microfarad that I have just put into a new set occupy a total width, with the vanes in the zero position, of only  $3\frac{1}{2}$  in. and the depth needed behind the panel is just 2 in. This compares pretty favourably with a width of  $5\frac{1}{4}$  in. and a depth of  $3\frac{1}{4}$  in., the space required by a pair of condensers of similar capacity that I acquired a couple of years ago. And the little fellows are quite as efficient and just as pleasant to work with. There seems to be a growing movement towards compactness in components

THERMION.

# NAUEN IN 1929

*An Account of a personal visit to the Famous High-power Station by DR ALFRED GRADENWITZ*



The technical development of the station had in the meantime been keeping pace with the extension of its task. As far back as 1911, Nauen's original equipment was replaced by a 100-kilowatt transmitter operated on the "musical spark" system. In 1916 there began the high-power development. In 1920 the construction of the new main building was completed, a beautiful architectural creation by Muthesius, which had been commenced four years before.

NAUEN, the huge station situated about thirty miles from Berlin, is a mirror of historic development, and an example of the present. In fact, no better means of investigating the history of radio engineering in Germany, nor of acquainting oneself with the most modern practice could be imagined than a visit to this world-famous high-power radio station.

When, therefore, the Transradio Company, an offspring of Telefunken, the other day, invited me to an inspection of Nauen, I gladly availed myself of this opportunity of seeing what there was new in its installations. Many a time during the last twenty years have I been a guest at Nauen, and each time there has been a lot that was new and interesting.

Founded as far back as 1906 by the Telefunken Wireless Telegraph Company, Nauen was originally intended to serve mainly as an experimental station, where machinery and apparatus for the wireless transmission of telegrams were to be tested. It then comprised merely a spark transmitter of 10 kilowatts, one mast 100 metres high, and an umbrella aerial.

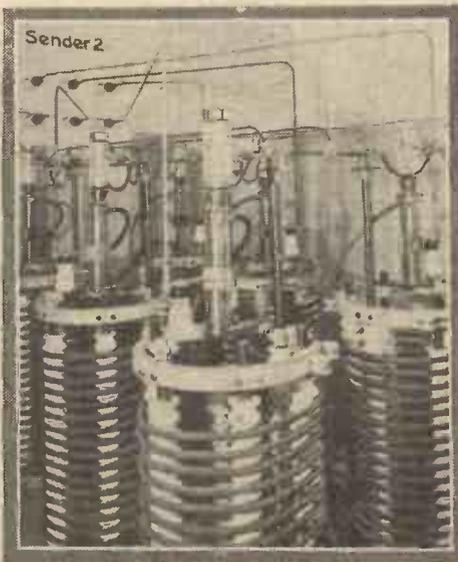
### Rapid Progress

Ranges of transmission then were rather modest, though rapid progress was made. Already in 1910 there were bridged distances of 3,000 kilometres, which by 1912 had grown to 4,700, by 1914 to 8,300, by 1916 to 11,000, and by 1918 to 20,000 kilometres, or half the circumference of the earth.

Radio telegraphy in other countries, particularly in Great Britain and the United States, had in the meantime been passing through a similar development, and a corresponding station was in 1911 installed at

Sayville. During the War Nauen was, of course, mainly used for military and political purposes, wireless telegraphy then affording the only means of communication Germany had with overseas countries.

However, in 1919, even before the conclusion of peace negotiations, the radio-telegraphic connection with the United States was resumed upon a suggestion coming from the other side. The Transradio Company of Wireless Overseas Traffic, which had been founded in the foregoing year and assumed ownership of Nauen, concluded a thirty years' agreement with the Radio Corporation of America, while the Reich at the same time granted the company for the same period a licence for the transmission of commercial and political telegrams.



The rectifier plant of Short-wave Station No. 2

Apart from the Nauen transmitting station, there is the Geltow, near Potsdam, receiving post and the Berlin central service office, which is located in Oranienburgerstrasse, on the premises of Post Office 24. From this central service office the transmitters installed at Nauen are operated at a distance by means of morse keys, while any telegrams arriving at the Geltow receiving station are, by means of special cables, led on to the central service office.

### The Various Transmitters

The Nauen high-power wireless telegraph station at present comprises the following transmitters:

One transmitter of 400-kilowatt aerial output, working on a wavelength of 18,000 metres; this mainly serves for traffic with the Far East, as well as for the press and time services. One transmitter of the same output on a wavelength of 13,000 metres; this, in the first place, serves for communication with North America. Two transmitters, each of 50 kilowatts, working on wavelengths of 6,500 and 5,600 metres respectively, used for the European service.

### South American Service

Plans were made in 1921 to develop the station even further for communication with South America. A gigantic aerial system was provided, which comprises: Two masts each of 260 metres, each weighing 360 tons; seven masts, each of 210 metres, each weighing 120 tons; and three masts, each 150 metres, each weighing 100 tons.

Transmission on long waves between Nauen and the Monte Grande (near Buenos Aires) wireless station only proved possible

NAUEN IN 1929—By Dr. Alfred Gradenwitz (Continued from preceding page)



The transmitting apparatus and switchboard of No. 2 Short-wave Station



The generators of the Nauen High-power Station

during certain hours of the day, and short waves very opportunely came to the rescue. In fact, Nauen was in rapid succession equipped with no less than seven short-wave transmitters, a wave of about 15 metres serving for the day and one of about 25 to 30 metres for the night service. Each of these transmitters has an aerial output of 20 kilowatts and frequencies intermediary between 20 million and 7.5 million cycles. They are each controlled by quartz crystals and built up in seven stages.

**Beam Aerials**

Beam aerials are used in connection with these short-wave transmitters, and larger

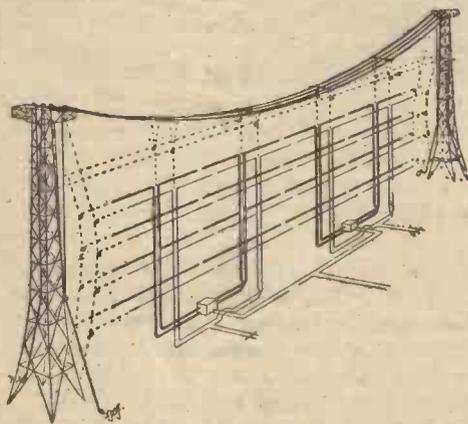


Diagram of the aerial system

“beams” suspended from towers 75 metres high are in course of building.

Apart from their use for wireless telegraphy, the transmitters also lend themselves to telephony and picture broadcasting. A wireless telephone system between Germany and Buenos Aires has been in existence since December last, working most satisfactorily. Telephone tests have also been made between these short-wave transmitters and Sydney, Australia, and Bangkok, Siam.

A private broadcasting station, a small replica of Radio LL, Paris, has been installed at Chatelaineau, a suburb of Charleroy (Belgium).

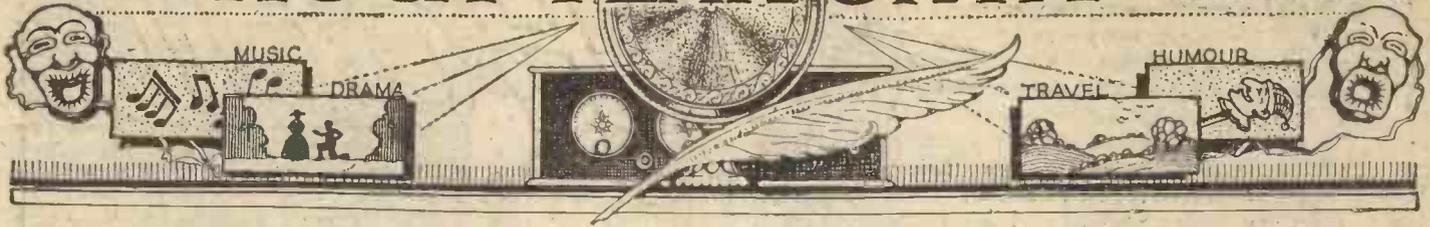
**YOUNG FLEX IN TAKING A CHAIR—**



**—APPEARS TO TAKE A MEAN ADVANTAGE**



# WITHOUT FEAR OR FAVOUR



*A Weekly Programme Criticism by Sydney A. Moseley*

IT gives me pleasure to start off the week's chat by handing out a very sincere bouquet. Fred Duprez is the recipient, and he gets the award for stepping into the breach.

Do you remember when he did it? It was when a certain opera broadcast (I forget which) didn't come off, and the B.B.C. were not aware that it wasn't to come off until the last moment. Duprez, I understand, happened to be at Savoy Hill when officials were beginning to fret and fume, and without a moment's notice this most competent comedian helped to fill the forbidding gap in the evening's entertainment.

His turn was extraordinarily good, and

hold Fatigue," should not be allowed to broadcast so early as 10.45 a.m. Why remind housewives that the work they are doing is fatiguing? I can see all our good ladies laying down tools before long if things go on like this!

Ann Penn gave us a fine turn from the London Coliseum not many moons ago. She is essentially the type of performer who is bound to be effective on the wireless.

She needs no facial contortions or physical mannerisms to get over. Her voice is all that is necessary. It does the trick. All her impersonations were excellent; but the one which scored, in my opinion, was that of Nellie Wallace.

Although I agree to a certain extent with the correspondent whom I quoted last week as saying that Sunday programmes are over-religious, I must say that the parts devoted to lay music are at times worth running five miles to hear.

The Wireless Military Band programmes, for instance, are always full of musical plums, aided as they are by good vocalists. All the following splendid numbers were included in a recent broadcast: Liszt's Rhapsody No. 2; "Ah fors e lui," from *Traviata*; Introduction to Act III and "Bridal Chorus" from *Lohengrin*; and MacDowell's "Sea Pieces."

And, like a ghost that cannot be laid, "The Londonderry Air" crept plaintively into the scheme!

How music-lovers must have shuddered when they heard 5GB's attempt to "jazz the classics"! And rightly. The classics should not be hacked about by second-rate dance-melody merchants. Probably a dance band consisting of good musicians could have carried it out without disgracing themselves very much; but to select a purely "straight" orchestra to syncopate the music was fair neither to highbrows nor lowbrows.

There must be a general feeling of regret that the B.B.C. Popular Orchestral Concerts from the People's Palace are over. They were excellent, and the final performance was a fitting ending to a memorable series.

The enthusiastic burst of applause at the opening notes of Doris Vane's encore, "Down in the Forest," was due to the fact that Sir Landon Ronald was accompanying at the piano.

By the way, weren't you a little disappointed with Sir Landon Ronald's setting to "Adonais," Shelley's lament on the death of Keats? It didn't seem dramatic enough, and at times was almost "pretty."

However, the performance as a whole was really enjoyable.

Were you fortunate enough to hear the Wireless Military Band play "Wee Macgregor Patrol" one day last week? I have heard "Wee Macgregor" played by all sorts and conditions of bands, but never have I heard it played with such a swing and a lilt. Walton O'Donnell is to be congratulated.

A correspondent from Northfields writes me a plaintive note. He wants to know when "The Foundations of Music" series will come to an end. In his own words, he is "bored stiff."

Well, I am not in a position to give the exact date of the expiration of this series, but I understand that they will go on until we know all there is to be known about music!



Ann Suter—A Lissenden impression

although some of us were probably disappointed because the opera was not broadcast, I am sure Fred gave us all a jolly time.

We have been treated lately to programmes which have been particularly well thought out. One in particular was "Suitable Songs—a light-hearted programme." It was quite good. Out of a most talented cast I think Jack Morrison deserved the most praise.

Miss Spielman, who is giving most interesting talks on the problem of "House-



Leonardo Kemp—Conductor of the Piccadilly Hotel Orchestra

**W**HAT do you expect when you get a portable set? Do you expect for the same outlay as necessitated by your home set, to get the same results wedded to the advantages of portability? If so, you are probably disappointed. To the many who have not yet seriously turned their attention towards taking radio out of doors it may be asked: Why don't you work a portable? The aspects of the answer to this latter question are manifold.

Perhaps you have one home set already, and this may not be very suitable for taking on picnic and river trips, and you hesitate to spend more money in making up a portable. Or perhaps two or more years ago you heard a friend's portable set working and the reproduction was so put to shame by that of your own home set that you said "No portables for me." Well, now is the time to reconsider all such early decisions.

**Three Valves Only**

Here we present the "Holiday Portable Three." It is a very worthy candidate in



The set is of particularly neat appearance

the number of portables which AMATEUR WIRELESS is putting forward this summer for selection by readers. In AMATEUR WIRELESS No. 354 we described the "Arcadian Portable," an entirely self-contained set in box form. Then we have the "Five Guinea Portable," described in AMATEUR WIRELESS No. 358, which is a simple two-valver needing an external aerial and loudspeaker. Again in No. 361 we have the "Talisman Portable" which fills a niche of its own.

These three preceding portables have, of course, not supplied all needs, and in this new "Holiday" set we are striking out along a new line. Briefly its salient points may be summarised as follows:

The "Holiday Portable" has been de-

# The HOLIDAY

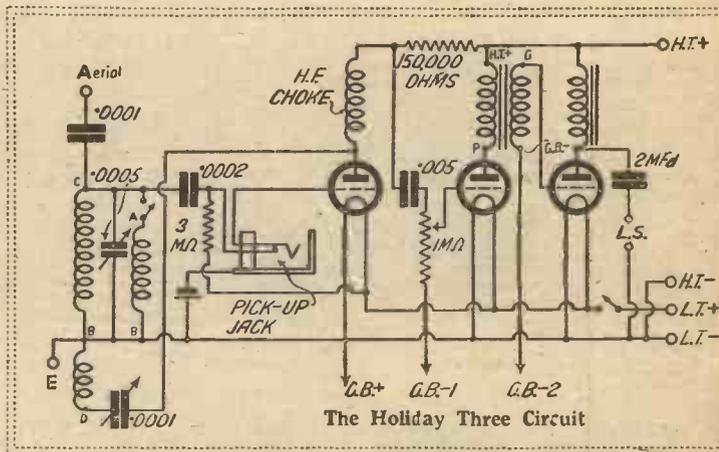


signed so that it can be used either as an indoor or outdoor set. As an indoor set you will find it the very latest and most up-to-date of "threes." It has provision for a gramophone pick-up, has one R.C. stage, a volume control and a choke output circuit. Altogether, as you can see, a proper set for purity. The same purity is obtained when the set is worked out of doors.

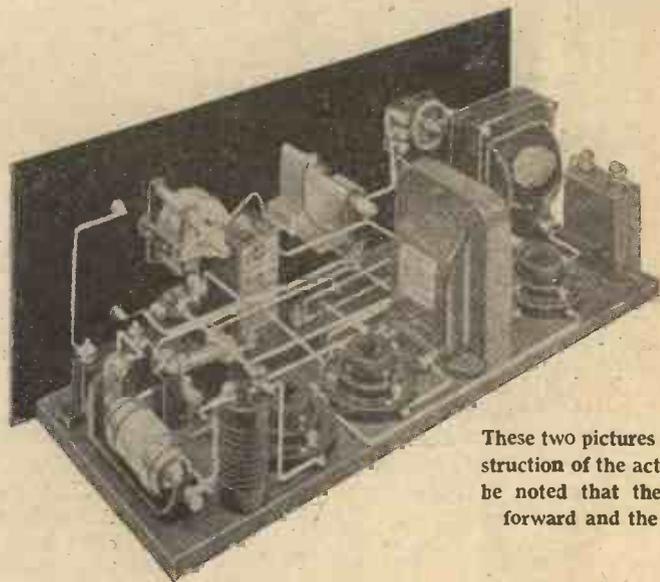
It is unnecessary to disguise the fact that this holiday set is ideal for indoor use, and that many of the amateurs who make it up will find it used extensively for ordinary programme reception at home. In fact this is bound to be the case, and unless the constructor is the possessor of a very modern set incorporating those refinements which are given in this portable set, he will find this portable a convenience indoors. To thousands of amateurs the following query may be addressed: Would you not care to have an up-to-date and efficient three-valver which includes every device to give purity, which allows you to operate your gramophone electrically and yet which is quite a self-contained unit complete with batteries and aerial?

**The Circuit**

If you care for technicalities and are not concerned only with wielding a soldering



The Holiday Three Circuit



These two pictures show construction of the actual set. It can be noted that the layout is neat and the wiring is forward and the wiring

# PORTABLE THREE



slides inside the cabinet. On this former are three windings; one is the reaction section and the other two sections are for aerial tuning. The two tuning sections are placed in parallel for the short waves and only one

is used for the long waves. The wave changing is effected simply by a push-pull switch on the panel and the tuning section

is shunted simply by a .0005-microfarad fixed condenser.

There is provision for an external aerial and earth. This can be effected without seriously affecting the tuning range of the aerial circuit because a small fixed condenser is in the lead from the aerial terminal to the grid end of the frame windings.

The grid circuit of the detector incorporates a .0001-microfarad grid condenser, a 3-megohm grid leak, a jack switching arrangement to allow the inclusion of a gramophone pick-up and a 1½-volt dry cell, which places a slight negative bias on the detector valve grid when this stage is used as the first L.F. amplifier after the pick-up.

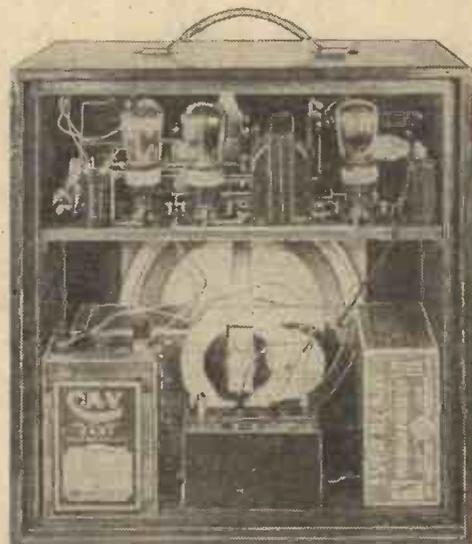
The values of the components in the R.C. coupler are as follows; anode resistance 150,000 ohms, coupling condenser

.005-microfarad, and the grid leak 1-megohm. It will be seen that this latter component is the winding of a potentiometer, the arm of which is connected to the grid of the first L.F. valve.

This potentiometer is, of course, the volume control on the panel and by connecting it in this way the volume can be varied from maximum down to a mere whisper, without any tonal change. This is rather an important point because in many sets, wherein the volume control is wrongly connected, cutting down of the signal strength also means cutting out the bass notes, and as the volume decreases the reproduction becomes tinny and unsatisfactory.

## L.F. Couplings

It will be seen that the coupling between the L.F. valve and the power valve is a "super" transformer. In practice it is found that a three-valver of this description gives most satisfactory results with one stage of resistance and one stage of transformer coupling. Particularly is this the case in a portable receiver where two trans-



A back view of the Holiday Portable

former-coupled stages need careful designing if they are to work properly (though there should be no difficulty about this and both the "Arcadian" and "Talisman" portables have the L.F. couplings arranged in this way), and two resistance-coupled stages may not give sufficient volume.

In the plate circuit of the power valve is a choke output arrangement which although perhaps adding a little to the weight of the whole portable is nevertheless a great advantage, particularly if the set is used at full volume on a near-by station, or with external loud-speakers.

The receiver itself is built up in a more or less conventional fashion with the panel at right angles to the baseboard. This

iron and screwdriver, just glance at the theoretical circuit diagram. The frame aerial is wound on a wooden former, which

## LIST OF COMPONENTS

Ebonite or bakelite panel, 18 in. by 6 in. (Raymond, Becol, Ebonart, Paxolin).

.0005-mfd. reaction condenser (J. B., Formo, Lissen, Igranic, Peto-Scott, Burton).

1-meg. vol. control (Rotor Electric). Two push-pull filament switches (Bulgin, Trix, Lissen, Benjamin).

Single-circuit-closed jack (Lotus No. 2). Three valve holders (Wearite, Lotus, Benjamin, Lissen, Trix).

.0001-mfd. fixed condenser (Dubilier type 620, Lissen, T.C.C., Mullard).

.0002-mfd. fixed condenser with series clip (Dubilier type 620, Lissen, T.C.C., Mullard).

.0005-mfd. fixed condenser (Lissen, Dubilier type 610, T.C.C., Mullard).

3-megohm grid leak (Lissen, Dubilier, T.C.C., Mullard).

High-frequency choke (Peto-Scott, Trix, Igranic, Burndept, Wearite).

150,000 ohms resistance with holder

(Varley, Ready Radio, Mullard, Lissen, Dubilier).

Low-frequency transformer (Lissen Super, Ferranti, R.I., Philips, Mullard, Igranic).

Output choke (Ferranti Br, R.I., Igranic).

2-mfd. fixed condenser (Dubilier, Lissen, Mullard, T.C.C.).

14-volt dry cell (Siemens).

Connecting wire (Glazite).

Three yards of thin flex (Lewcoflex).

Two red and three black wander plugs (Clix). Two spade terminals (Clix).

Cone chassis complete (Squire P.W. 77, White Spot).

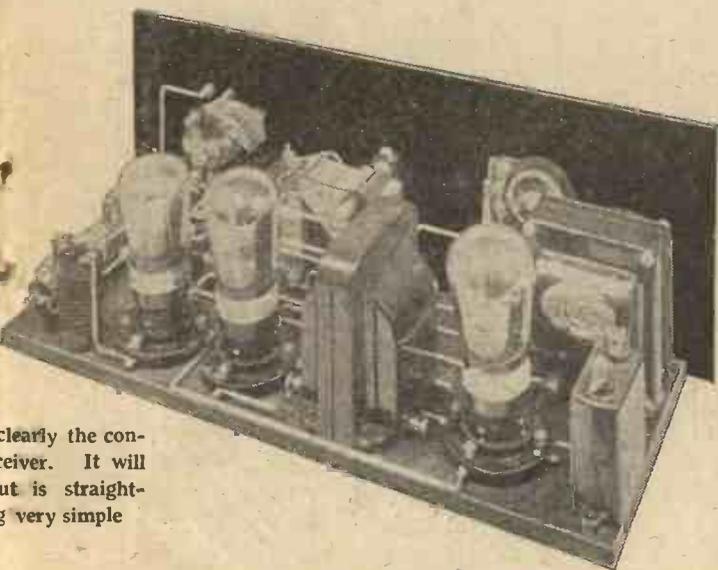
Loud-speaker unit (Blue Spot, Trio-tron, Hegra).

Portable cabinet (Lock).

No. 21 enamelled wire (Lewcos).

Two 60-volt H.T. batteries (Ever Ready, Popular Portable).

2-volt accumulator (C.A.V., type 2A.N.7, Ever Ready).



clearly the con-  
ceiver. It will  
ut is straight-  
g very simple

“THE HOLIDAY PORTABLE THREE” (Continued from preceding page)

complete unit then slips inside the cabinet and is supported on wooden fillets, on the inside of the wooden former carrying the frame aerial windings. The loud-speaker is mounted on the front board of the cabinet, and connections are made thereto by means of flex from the components on the receiver shelf.

The list of parts as shown on page 803 will be required for building the “Holiday Portable Three.” As usual the first mentioned component in each case is that used in the original receiver and illustrated in the accompanying photographs. Following these are a number of alternatives having, as near as possible, the same electrical value, and these alternatives can be used without serious modification of the original layout. A word of warning is perhaps opportune when building a high-class receiver such as this. Do not be tempted to buy cheap parts of obscure make or even well-known parts if offered at a cut price. Cut-price articles are frequently factory throw outs and the few shillings saved may utterly spoil results. Therefore, adhere to the list on the preceding page.

Construction

The first operation is to drill the panel for the components, but they should not all be mounted right at the start. As in most portables there is not a great deal of room to spare and so the construction cannot be carried out in a haphazard manner. For safety's sake adhere to the following scheme.

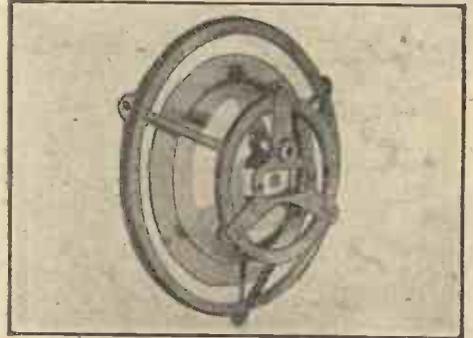
With the blueprint as a drilling template (the print is available, price 1s. post free, from Blueprint Department, AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4), drill the holes for the aerial tuning condenser and reaction condenser, the volume control, the two push-pull switches, the pick-up jack, aerial and earth sockets and the fixing screw holes. Mount only the two switches and pick-up jack, and attach the panel to the baseboard.

Wiring

Now place in position the following parts, from left to right of the baseboard, viewed from the back of the panel: Anode resistance clips, H.F. choke, grid condenser and leak clips, R.C. coupling condenser, and the three valve holders. As you will see from the list of components it is recommended that rigid insulated wire, such as Glazite, should be used for connecting up and when the foregoing parts are mounted, with the blueprint used as a guide to the exact positions, there is no reason why they should not be wired up so far. You will see that the layout is such that very short and direct wires are possible in most cases. For the connections to the batteries below and the loud-speaker and frame aerial, flex leads are taken from the components.

When the foregoing parts have been connected the remainder may be added in turn, starting with the reaction and aerial variable condensers and volume control and finishing up with the output choke and condenser, which should be the last two

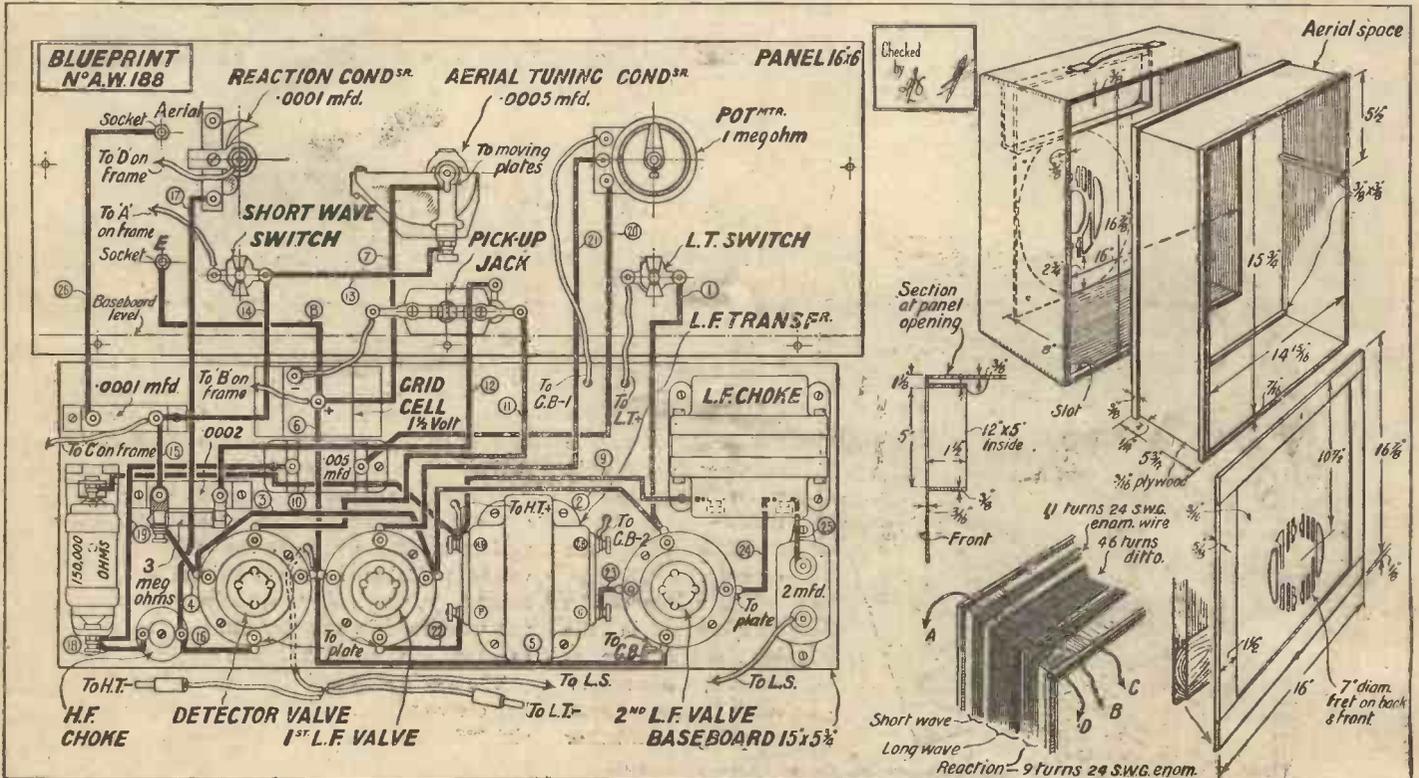
components to be wired up. In this way you will find that there is no difficulty in making proper soldered joints owing to restricted space in which to handle the iron; and whatever one's feelings may be about soldering in a house set it is an undeniable advantage in a portable.



An alternative cone chassis—the White Spot

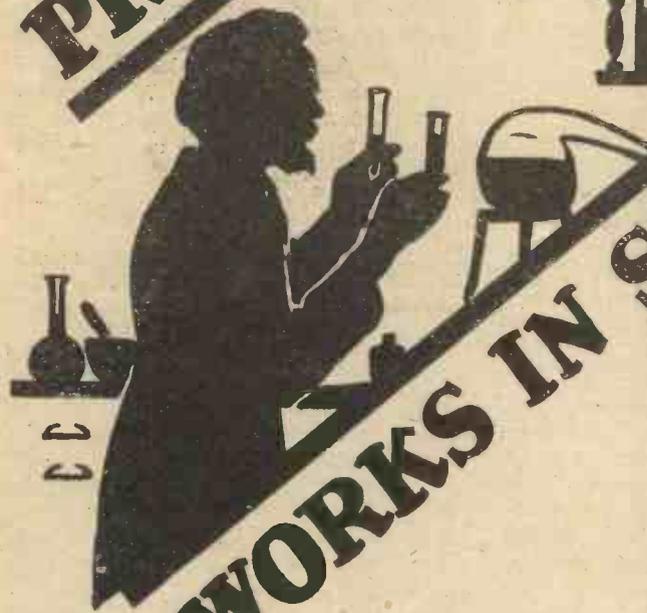
Endeavour to copy as nearly as possible the original layout of the wiring as is clearly shown on the blueprint. This is important because towards the left-hand side of the set, looking from the back, there are a number of wires running parallel. Some of these carry H.F. currents, some L.F. currents and some D.C. currents and unless the spacing is correct interaction may be set up.

This “Holiday Portable” is being shown at Messrs. Selfridge's Radio Department, in the Somerset Street windows. Next week the frame aerial will be described, and instructions will be given for working the receiver.



The wiring diagram, with constructional details of case and frame aerial

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# VALVES—A GUIDE TO ASSIST YOUR CHOICE

**H**OW do you choose your valves? When fitting up a new set, do you go solely by the advice of your local dealer? When you are unlucky enough to burn out a valve, do you take the old box to a dealer and ask for a valve of a similar type?

These are haphazard ways of choosing. In the following tables you will find catalogued all 2- and 4-volt valves of the most prominent manufacturers available. If you use these tables correctly you will never have any trouble in picking the right valve—and that means that you will get the best results from your set, for results depend so much on the valves you use.

Take the 2-volt table, for example, which

is first. You will see that the valves are graded in order of their impedance, and even the least technical listener knows that the components connected to the anode of a valve have to match the valve electrically.

This means that there must be a certain relation between their impedances, and it is this which determines in which position a valve must be used. As a general rule, the higher the impedance, the greater the amplification factor; but there are other factors to be considered.

Valves with high impedances are used in resistance-coupled stages, those with impedances of the order of 50,000 ohms sometimes as R.C. valves, but more frequently as high-

frequency amplifiers, while those with impedances of the order of 25,000 ohms are usually general-purpose valves, and are suitable either for high-frequency amplification or detection. There are, however, general-purpose valves with impedances so low as 14,000 ohms, and these are used as detectors, sometimes with anode-bend rectification, and in some sets as the first L.F. stage.

Valves with impedances of about 5,000 ohms are power valves, while super-power valves have impedances so low as 2,000 ohms. These remarks apply equally, of course, to 2-, 4-, and 6-volt valves. Screen-grid valves and pentodes are available now for all voltages, and details of these will be given next week.

## TWO-VOLT VALVES: Three-electrode Types

Make.	Impedance.	Amp. Factor.	Fil. Current.	Type.	Make.	Impedance.	Amp. Factor.	Fil. Current.	Type.
Cleartron ...	250,000			CT215H	Cossor ...	12,000	10	.1	210LF
Dario ...	150,000	50	.06	RC	Marconi ...	12,000	11	.1	DEL210
Ediswan ...	150,000	30	.1	RC2	Mullard ...	12,000	11	.1	PM1LF
Mazda ...	86,000	40	.1	RC210	Osram ...	12,000	11	.1	DEL210
Cosmos ...	70,000	35	.09	SP16B	Triotron ...	11,400	8.5	.06	TD2
Six-Sixty ...	68,000	35	.1	210RC	Mullard ...	10,700	13.5	.25	PM2DX
Ediswan ...	67,000	40	.1	RC210	Cosmos ...	10,000	9	.09	SP16R
Cossor ...	60,000	40	.1	210RC	Six-Sixty ...	7,300	6.4	.15	215P
Mullard ...	51,000	36	.1	PM1A	Mazda ...	7,000	7	.15	LF215
Marconi ...	50,000	35	.1	DEH210	Ediswan ...	6,600	8	.15	PV215
Osram ...	50,000	35	.1	DEH210	Triotron ...	6,250	5	.1	ZD2
Triotron ...	46,000	46	.07	WD2	Cleartron ...	5,000	3.5	.3	CT15X
Mazda ...	28,000	20	.1	HF210	Cossor ...	5,000	5	.2	220P
Six-Sixty ...	27,000	13	.1	210HF	Marconi ...	5,000	7	.15	DEP215
Ediswan ...	25,000	20	.1	HF210	Osram ...	5,000	7	.15	DEP215
Marconi ...	23,000	20	.1	HL210	Cosmos ...	4,500	6.5	.2	SP18RR
Osram ...	23,000	20	.1	HL210	Dario ...	4,500	9	.18	SP
Mullard ...	22,500	18	.1	PM1HF	Mullard ...	4,400	7.5	.2	PM2
Cossor ...	20,000	15	.1	210HF	Cossor ...	4,000	8	.3	220P
Dario ...	20,000	12	.05	GP	Six-Sixty ...	4,000	3.9	.3	230SP
Triotron ...	20,000	9	.2	T10	Triotron ...	3,750	6	.2	UD2
Triotron ...	20,000	16	.07	HD2	Mazda ...	2,900	4	.27	P227
Cleartron ...	18,000	7.5	.15	CT15	Ediswan ...	2,700	3	.25	PV225
Six-Sixty ...	18,000	8.5	.1	210LF	Mullard ...	2,600	5.4	.3	PM252
Cosmos ...	17,000	16	.09	SP16G	Marconi ...	2,500	4	.4	DEP240
Triotron ...	15,000	20	.12	SD2	Osram ...	2,500	4	.4	DEP240
Mazda ...	14,000	13	.1	GP210	Cossor ...	2,000	4	.3	230XP
Ediswan ...	13,000	13	.1	LF210					

## FOUR-VOLT VALVES: Three-electrode Types

Make.	Impedance.	Amp. Factor.	Fil. Current.	Type.	Make.	Impedance.	Amp. Factor.	Fil. Current.	Type.
Dario ...	150,000	50	.07	RC	Osram ...	8,500	15	.1	DEL410
Mazda ...	100,000	40	.075	RC407	Cleartron ...	8,000	4	.15	CT10X
Six-Sixty ...	64,000	34	.075	4075RC	Six-Sixty ...	8,000	7.3	.1	410P
Ediswan ...	61,000	40	.1	RC410	Triotron ...	7,700	15.5	.14	SD4
Cossor ...	60,000	40	.1	410RC	Mullard ...	7,500	15	.1	PM4DX
Marconi ...	60,000	40	.1	DEH410	Mazda ...	5,700	8	.075	LF407
Osram ...	60,000	40	.1	DEH410	Ediswan ...	5,500	5.5	.1	PV410
Mullard ...	55,000	38	.075	PM3A	Marconi ...	5,000	7.5	.1	DEP410
Triotron ...	46,000	46	.07	WD4	Osram ...	5,000	7.5	.1	DEP410
Ediswan ...	22,000	25	.1	HF410	Dario ...	4,500	9	.1	SP
Mazda ...	21,000	18	.075	HF407	Ediswan ...	4,500	9	.1	LF410A
Cossor ...	20,000	20	.1	410HF	Mullard ...	4,450	8	.1	PM4
Dario ...	20,000	12	.05	GP	Cossor ...	4,000	8	.1	410P
Six-Sixty ...	16,500	13	.075	4075HF	Triotron ...	3,750	6	.1	UD4
Cleartron ...	15,000	7.5	.1	CT10	Six-Sixty ...	3,600	3.2	.25	425SP
Mazda ...	14,000	14	.075	GP407	Mullard ...	3,500	3.15	.25	PM254
Mullard ...	13,000	14	.075	PM3	Mazda ...	2,900	5.5	.15	P415
Triotron ...	13,000	13	.07	AD4	Marconi ...	2,250	4.5	.25	P425
Ediswan ...	10,500	13	.1	LF410	Osram ...	2,250	4.5	.25	P425
Triotron ...	9,000	9	.07	RD4	Triotron ...	2,200	6	.15	XD4
Cossor ...	8,500	15	.1	410LF	Cossor ...	2,000	4	1.5	415XP
Marconi ...	8,500	15	.1	DEL410	Ediswan ...	2,000	3	.25	PV425

Details of Six-volt Three-electrode, Screen-grid and Pentodes of all types will be given in our next issue



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Obtainable from C.A.V. Depots, Battery Service Agents and all Wireless Dealers.



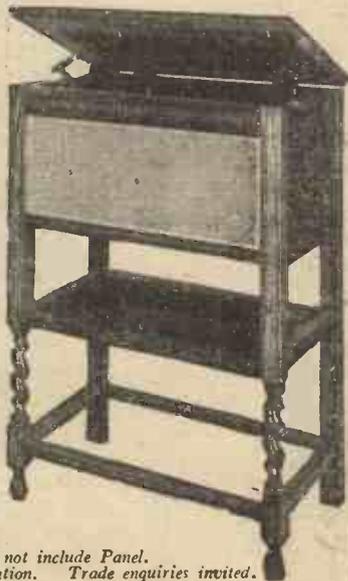
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 Stands to fit either of above ... 2/6 each  
 If you want to hear the bass, get particulars of our Corner Baffle.  
 "White Spot" Chassis can be obtained from any Retailer, or from

**WOLVERHAMPTON DIE CASTING Co.**  
Great Hampton Street, Wolverhampton.



**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, layouts, diagrams, etc., on separate sheets containing your name and address. See announcement below. Address Queries—AMATEUR WIRELESS Information Bureau, 58/61 Fetter Lane, London, E.C.4

**Frame-aerial Types.**

Q.—I am about to make up a portable set, but before deciding upon the type of cabinet, I wish to know which is the most efficient type of frame aerial, the box type or the pancake type? I ask this question because there seems to be a diversity of opinion among my acquaintances.—G. H. (Wrotham).

A.—From the theoretical point of view, the box-type frame aerial is the more efficient type, inasmuch as in this type all turns of wire in the frame aerial accept energy from the stations it is desired to receive when the frame is arranged in the direction of the transmitting station. In the case of the pancake or multi-layer frame aerial, the outside turn of the winding is the only one that actually presents a surface to the wave-front and the turns behind it are more or less shielded from the wave-front by the first turn. In actual practice there is very little to choose between the two types of frame winding, owing to the fact that with most portable sets the dimensions of the frame windings are so small.—C. L.

**Neutralising Your Set.**

Q.—I have worked a neutralised receiver for some time, but not knowing the correct procedure

to adopt to neutralise the set, I am afraid I have never obtained the results of which the set must

**When Asking  
Technical Queries**

*PLEASE write briefly  
and to the point*

A fee of One Shilling (postal order or postage stamps) must accompany each question and also a stamped addressed envelope and the coupon which will be found on the last page. Rough sketches and circuit diagrams can be provided for the usual query fee. Any drawings submitted should be sent on a separate sheet of paper. Wiring plans and layouts cannot be supplied.

be capable. Can you advise me how best to neutralise?—J. K. (Middlesex).

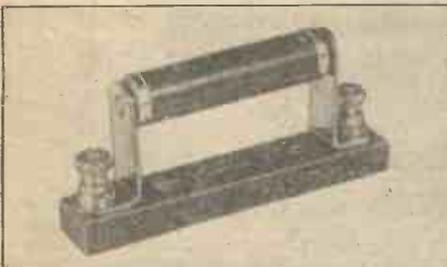
A.—The first thing to do is to tune in the local or nearest station to maximum strength. Keep the reaction control set to minimum. If the set tends to oscillate disregard this, but see that the tuning controls are arranged so that the station being received is at the maximum point of strength. Now either switch off the filament current to the H.F. valve or, if there is no rheostat, disconnect one of the filament wires going to the H.F. valve holder. Signals from the local station will still be heard, but much weaker of course. Turn the knob of the neutralising condenser until these signals are either completely eliminated or reduced to the minimum strength. The filament lead to the H.F. valve can now be connected up once more or the rheostat turned on and the receiver will be properly neutralised for the band of wavelengths which the tuning coil covers. If another tuning coil is inserted, then the procedure of neutralising must be again carried out with the different coil. If there are more than one H.F. stage, then, when the first valve is neutralised, its filament circuit should be completed and the filament of the second H.F. valve switched off and this valve neutralised in the same way as the first valve.—C. L.

**“A.W.” TESTS OF APPARATUS**

Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

**Ready-Radio Resistance**

THE importance of filter circuits in the high-tension leads of high-frequency amplifiers has already been discussed in these columns. It was stated that such a filter functions in a similar manner to the type used in a low-frequency amplifier, the



Ready Radio 500-ohm fixed resistance for filtering. It is wound with Eureka wire difference being that in the former case it is used to prevent high-frequency oscillations, and in the latter low-frequency oscillations being produced. This week we have tested a neat little filter resistance made by the Ready Radio

Co., of 159 Borough High Street, S.E.1. This consists of a cartridge similar in size and appearance to the normal grid leak. The base is mounted in a special holder, which comprises two pins mounted on an attractively finished insulated material.

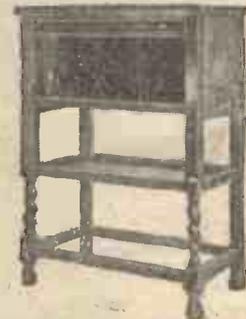
The resistance of this cartridge is labelled as 500 ohms; actually we found that it had a value slightly exceeding 500 ohms. The difference is immaterial in practice.

A dissection of the cartridge showed that the material employed comprises a length of Eureka wire wound inductively on a wooden former having a diameter similar to that of a match-stick. It should be almost impossible to burn the component out or to change the resistance value by burning off the insulation, due partly to the fact that No. 42 gauge wire is employed and that the winding is placed in a single layer without any covering. In our experiments we actually passed over 50 milliamps through the resistance without causing any change in its value or any sign of breakdown.

This component may be recommended.

**Langmore Wireless Cabinets**

MANY constructors of sets do not consider the question of a suitable cabinet to house their receiver when built. After spending a considerable amount of



A typical Langmore receiver cabinet with a shelf for batteries

time and trouble making a good set it surely deserves to have a good home. We think the need is met by the Langmore wireless cabinets, made by the Miscellaneous Trading Co., Ltd.

These cabinets are extraordinarily well made and finished, and are made in four  
(Continued on page 812)

# FOR PORTABLES



The two Squire loud-speaker cradles and cones illustrated here are a definite improvement on the average type of loud-speaker hitherto available for receivers. The Squire polished aluminium cradle is very light, does not cause aerial interference, and is notable for its rigidity and compactness.

*P.77. The Squire Universal model complete with latest type vellum cone and cradle suitable for taking Blue Spot, Triotron and other units.*

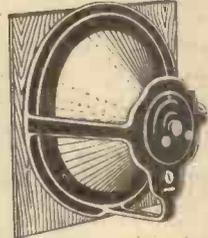
*Note: This unit is only 2 1/2" deep and is specially suitable for inclusion in Portable Receivers.*

**Cradle complete with Cone . . . 18/6**

*97. This is another Squire model suitable for general use, and takes a 9 1/2" cone. Has standard fitting for Blue Spot, Triotron and other units. Special model for Hegra unit.*

**Cradle complete with latest type Vellum cone . . . 15/-**

*A Squire unit similar to this is specified for the Holiday Portable in this issue of Amateur Wireless*



FREDK.

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For Charging  
2- and 4-v.  
Accumulators.

**29/6**

For Charging  
2-, 4- and 6-v.  
Accumulators.

**38/6**



Simply fix plug into lampholder, then attach spade terminals to accumulator and switch on.  
A 4-volt accumulator can be charged any time the Set is not in use at cost of 1d.

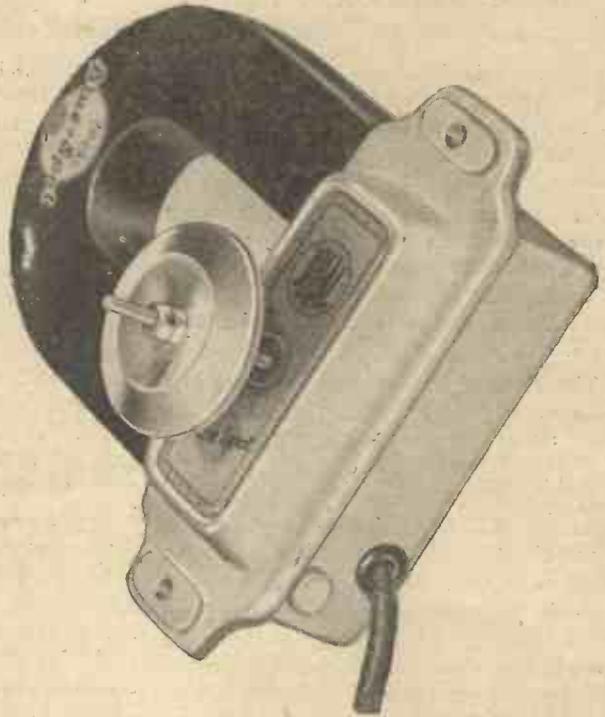
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**DR. NESPER LTD.,**

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## brother to the famous 66K ?

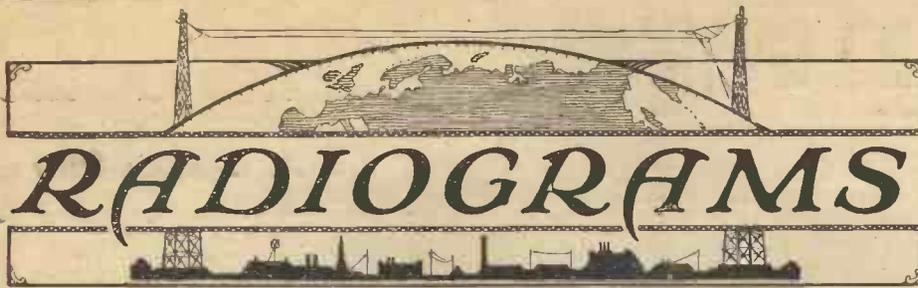
The Blue Spot 66A is exactly the same as the wonderful Blue Spot 66K Unit but without the adjusting device. In particular the 66A is the Ideal unit for the portable set because it has been adjusted by experts to the very closest possible limits, and requires no further attention whatever to reproduce the finest quality of music or the purest form of speech.

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You will Help Yourself and Help Us by Mentioning "A.W." to Advertisers



THE thanksgiving service for the King's recovery, to be relayed from Westminster Abbey on June 16, at 11 a.m., will be transmitted from all B.B.C. stations as well as from 5SW (Chelmsford).

On June 21, 2LO and 5XX will transmit an excerpt from the musical comedy, *Mr. Cinders*, as performed at the Adelphi Theatre. The cast includes Jack Melford, Basil Howes, Lorna Hubbard, and Binnie Hale.

The Covent Garden opera season terminates on June 28, when the B.B.C. will relay an act of whatever opera has been chosen for the occasion.

A revival of Oscar Wilde's brilliant comedy, *The Importance of Being Earnest*, is promised by the Birmingham studio for relay to 5GB on June 20.

Apart from early-morning concerts from some studios, the German transmitters have fixed the following late musical entertainments for the month of June: Hamburg (6th), Berlin (8th), Breslau (12th), Koenigsberg (14th), Munich (18th), Frankfurt-on-Main (22nd), Stuttgart (26th), and Leipzig (28th). The broadcast starting on the above dates at 12.30 a.m., lasts for a full hour; it will be transmitted by both main stations and their respective relays, and will consist of light popular vocal and orchestral music.

According to the latest statistics, there are now 16,928 licensed amateur transmitters in the United States of America.

Japan, at the end of 1928, had 532,000 licensed listeners, of which roughly 280,000 resided in the Tokio district, a further 138,000 being served by the Osaka broadcasting system.

A vaudeville programme arranged for transmission from 2LO and 5XX, on June 17, will feature a famous up-river cabaret. Amongst the artistes to be heard on that evening are Keith Wilbur, the New Zealand mimic, and possibly Melville Gideon and Tommy Handley.

As in previous years, the B.B.C. will relay a portion of the Aldershot Command Searchlight Tattoo, which opens at the Rushmoor Arena on June 18. The transmission will be made from 9.35 to 9.55 p.m., and a gain from 10.47 to the end of the grand finale. In the musical part of the programme some twenty-two bands, drummers of eleven regiments, and a whole "battery" of bugles will take part.

Tests with the Baird television apparatus in Berlin, which had been discontinued for some weeks, have now been resumed, and it is expected that a public demonstration may shortly be made through the Witzleben broadcasting transmitter.

PHOHI (Huizen) is the call sign of the high-power short-wave Dutch transmitter erected on the borders of the Zuyder Zee. The initials stand for Philips-Holland-Indien-Rundfunkgesellschaft. The power of the station is 60 kilowatts and transmissions are made on 16.88 metres. PCJ (Hilversum) was erected by the same firm.

In the course of thirteen months the Detroit (U.S.A.) police authorities effected six hundred and five arrests through the assistance of eight mobile radio transmitting and receiving stations. In some instances the capture of the criminals was carried out within a few minutes of the reception of orders sent out by Central Headquarters.

The Soviet authorities formally opened on May 8 last a powerful telephony transmitter at Khabarovsk on the borders of Manchuria (Asia) for the purpose of broadcasting propaganda programmes in the Chinese, Korean, and English languages.

The Universal Broadcasting System of Philadelphia has made an application to the Federal Radio Commission at Washington for short-wave channels for the reproduction of French and German programmes in America. WCAU, Philadelphia, would be the key station for the oversea service. It was stated that there would be no attempt to cover England, which is already sending through the National Broadcasting Company in New York.

Following the winding up of the Radio Peredacha and the taking over of all broadcasting stations by the Soviet Posts and Telegraphs, the power of the Leningrad transmitter has been gradually raised to 20 kilowatts. No interval signal is used, but the broadcast may be identified by a call frequently repeated, namely: "Sloochaite! Sloochaite! Govorite Leningrad dlina volny teeseatcha metrov" ("Listen! Listen! This is Leningrad calling on 1,000 metres").

It is seldom that an English composer is called to a foreign broadcasting station to conduct his own works, but on June 4, according to the P.T.T. Lyons programme, Mr. Ketelbey will personally direct at that studio a rendering of his most popular melodies.

According to the new Prague Plan, Belgium is to be granted an additional exclusive wavelength, namely, 208 metres, which may eventually be used for broadcasts in the German language, destined to the inhabitants of Malmédy, Eupen, and other German-speaking districts, conceded to Belgium after the Great War.

Following the example set by Berlin, the Hamburg broadcasting studio has resumed its early week-end musical entertainments. A concert may now be picked up from that station, or through one of its relays, on Sunday mornings at 6 a.m. B.S.T.

## ROTOR-OHMS

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Type.	Ohms.	Milliamps.
F.	0-2,000	37.5
K.	0-5,000	23.0
G.	0-10,000	16.5
H.	0-25,000	10.5
C.	500-50,000	7.5
D.	10,000-70,000	2.0
B.	1,500-100,000	5.0
J.	0-200,000	4.0
L.	0-500,000	2.5
M.	0-1 Megohm	1.3
A.	1/10-7 Megohms	0.2

As specified on page 802.

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ARTHUR PREEN & CO. LTD.

# BROADCAST TELEPHONY

(Broadcasting stations classified by country and in order of wavelengths)

Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)
<b>GREAT BRITAIN</b>											
25.53	11,757	Chelmsford		292	1,028	Radio Lyons ...	1.5	278	1,078	Turin .....	7.0
		(5SW) 15.0		300	996	Bordeaux (PTT) ...	0.5	333	900	Naples (Napoli) ...	1.5
243.9	1,230	Newcastle (5NO) 1.0		309	970	Vitus (Paris) ...	2.0	387	775	Genoa (IGE) ...	3.0
258.6	1,160.1	*Leeds (2LS) ... 0.13		318	943	Marseilles (PTT) ...	0.5	442	677	Rome (Roma) ...	3.0
288.5	1,040	*Sheffield (8LF) 0.13		336	897	Petit Parisien... ..	0.5	450	666	Bolzano .....	0.3
288.5	1,040	*Bournemouth (6BM) 1.0		352	852	Algiers (PTT) ...	2.0	503.5	596	Milan .....	7.0
288.5	1,040	*Edinburgh (2EH) 0.35		368	815	Radio LL, Paris ...	1.0	<b>JUGO-SLAVIA</b>			
288.5	1,040	*Hull (6KH) 0.2		384	784	Toulouse (Radio) 9.0		308.3	973	Zagreb (Agram) 1.25	
288.5	1,040	*Dundee (2DE) 0.13		413	725	Radio Maroc (Rabat) 2.0		450	663	Belgrade .....	4.0
288.5	1,040	*Liverpool (8LV) 0.13		429	699	Grenoble (PTT) 1.5		582	515	Ljubljana .....	5.0
288.5	1,040	*Stoke-on-Trent (8ST) 0.13		436	687	Radio Flandre Lille 0.5		529	597	Riga .....	2.0
288.5	1,040	*Swansea (6SX) 0.13		446	672	Paris (Ecole Sup., PTT) 0.7		<b>LITHUANIA</b>			
288.5	1,040	*Plymouth (5PY) 0.13		468.8	640	Lyons (PTT) ... 5.0		2,000	150	Kovno .....	15.0
294.1	1,020	*Belfast (2BF) 1.0		1,350	222	Tunis (testing) ... 8.0		<b>NORWAY</b>			
302.6	997.1	Aberdeen (2BD) 1.0		1,473	203	Eiffel Tower ... 8.0		242	1,240	Rjukan .....	1.0
311	964	Cardiff (5WA) 1.0		1,749	171	Radio Paris ... 8.0		207	1,020	Notodden .....	0.7
323	928	London (2LO) 2.0		1,825	164	Radio Carthage (Tunis) ... 0.7		365	820	Bergen .....	1.0
358	838	Manchester (2ZY) 1.0		<b>GERMANY</b>							
401	748.3	Glasgow (5SC) 1.0		219	1,370	Flensburg .....	1.5	456	657	Aalesund .....	1.0
482	622	Daventry Ex. (5GB) 17.0		240	1,250	Nurnberg .....	4.0	496	604	Oslo .....	1.5
1,566.5	191.5	†Daventry (5XX) 25.0		250	1,200	Kiel .....	0.7	577	599.9	Hamar .....	0.7
* Relay stations. † Relays 2LO.											
<b>AUSTRIA</b>											
250	1,200	Linz .....	0.5	250	1,200	Cassel .....	0.7	<b>POLAND</b>			
283	1,060	Innsbruck .....	0.5	283.2	1,140	Cologne .....	4.0	314	955	Cracow .....	1.5
354.2	847	Graz .....	3.0	267.8	1,120	Muenster .....	1.5	337	890	Posen .....	1.5
456	694	Klagenfurt .....	0.5	275	1,090	Kaiserslautern 1.5		415.5	722	Katowitz .....	10.0
520	577	Vienna .....	20.0	280.4	1,070	Königsberg .....	4.0	456	658	Wilno .....	1.5
<b>BELGIUM</b>											
230	1,300	Chateleineau ... 0.25		283.1	1,058	Berlin (E) .....	0.7	1,397	214	Warsaw .....	10.0
249	1,203	Schaerbeek-Brussels 0.5		283.1	1,058	Stettin .....	0.7	<b>PORTUGAL</b>			
250	1,200	Ghent .....	0.5	317.5	945	Magdeburg .....	0.7	317.5	945	Lisbon CTIAA (Wed) and Sat.: 10—midnight)	
280	1,070	Liège .....	0.5	320	937	Dresden .....	0.75	<b>ROUMANIA</b>			
512	586	Brussels .....	10.0	326.4	910	Breslau .....	4.0	395	757	Bucharest .....	4.0
<b>CZECHO-SLOVAKIA</b>											
265	1,128	Kosice .....	2.0	329	910	Bremen .....	0.75	<b>RUSSIA</b>			
278	1,080	Feriby (testing) 12.0		301.0	829	Leipzig .....	4.0	492	609	Rjankov (NKO) 5.0	
306	950	Bratislava .....	4.0	374.1	803	Stuttgart .....	4.0	825	363.6	Moscow (PTT) 25.0	
343	873	Prague (Praha) 5.0		391.6	766	Hamburg .....	4.0	925	323	Hoinel .....	2.5
432.3	694	Brunn (Brno) ... 2.4		427	711	Frankfurt .....	4.0	1,000	299	Leningrad .....	20.0
<b>DENMARK</b>											
339	883	Copenhagen (Kjobenhavn) 1.0		455.9	654	Danzig .....	0.75	1,440	208	Moscow .....	30.0
1,168	259	Kalundborg ... 7.5		456	651	Aachen .....	0.75	1,654	178	Kharkov .....	15.0
<b>ESTHONIA</b>											
408	735	Reval (Tallinn) 1.3		462.2	649	Langenberg ... 25.0		<b>SPAIN</b>			
<b>FINLAND</b>											
374	800	Helsingfors (Helsinki) 0.8		476	630	Berlin .....	4.0	277.8	1,080	Barcelona (EA J13) 10.0	
1,510	200	Lahti .....	20.0	538	558	Munich .....	4.0	314	956	Oviedo (EA J19) 0.5	
<b>FRANCE</b>											
175	1,714	St. Quentin .....	0.25	566	530	Augsburg .....	0.5	324	925	Almeria (EA J18) 1.0	
212	1,415	Fécamp .....	0.3	566	530	Hanover .....	0.7	340.8	865	Barcelona (EA J11) 10.0	
211.3	1,420	Beziers .....	0.1	577	520	Freiburg .....	0.7	369	811	Seville (EA J5) 0.5	
238	1,260	Bordeaux (Radio Sud-Ouest) 2.0		1,651	181.7	Zeesen .....	20.0	400	750	Radio España 1.0	
240	1,250	Radio Nimes ... 1.0		1,651	181.7	Norddeich .....	10.0	405	740	San Sebastian (EA J8) 0.5	
244	1,219	Lille (PTT) ... 0.8		<b>GRAND DUCHY OF LUXEMBOURG</b>							
250	1,190	Juan-les-Pins ... 0.4		1,220	245	Radio Luxembourgeois .....	0.5	423.7	703	Madrid (EA J7) 3.0	
254	1,180	Kennes (PTT) 1.0		<b>HOLLAND</b>							
255	1,175	Toulouse (PTT) 1.0		31.4	9,554	Eindhoven (PCJ) 25.0		456	658	Salamanca (EA J22) 0.55	
268	1,173	Strasbourg .....	0.3	336.3	891.5	Huizen (until 5.40 p.m. B.S.T.) 5.0		<b>SWEDEN</b>			
274	1,092	Limoges (PTT) 0.5		1,076	278	Hilversum (ANRO) 5.0		261	1,750	Hörby .....	10.0
285	1,050	Montpellier ... 1.5		1,840	162.5	Huizen (after 5.40 p.m. and on Sundays) 5.0		265	1,730	Trollhattan .....	0.4
<b>HUNGARY</b>											
548	548	Budapest .....	15.0	1,840	162.5	Scheveningen-haven 6.0		333	900	Falun .....	0.5
<b>ICELAND</b>											
333.3	900	Reykjavik .....	1.0	<b>SWITZERLAND</b>							
<b>IRISH FREE STATE</b>											
222.2	1,350	Cork (5CK) .....	1.5	406	739	Berne .....	1.0	496	604	Zurich .....	0.8
411	730	Dublin (2RN) 1.5		680	441	Lausanne .....	0.8	760	395	Geneva .....	0.5
<b>TURKEY</b>											
1,200	250	Stamboul .....	5.0	1,010	297	Basle .....	0.25	1,809	264	Angora .....	5.0

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WHEN A BETTER LOUD SPEAKER IS MADE—CELESTION WILL MAKE IT.

## CHIEF EVENTS OF THE WEEK

### LONDON AND DAVENTRY (5XX)

- June 10 Vaudeville programme.
- " 11 Covent Garden opera.
- " 12 *Minna Von Barnhelm*, a comedy by Lessing.
- " 13 "The Cabman's Shelter," by A. J. Alan.
- " 14 A light symphony concert.
- " 15 "More Djinn and Bitters."

### DAVENTRY EXPERIMENTAL (5GB)

- June 12 "Micro-Phun," a song and laugh show, by Edmund Wynschenk.
- " 13 *The Island Princess*.
- " 15 Vaudeville programme.

### MANCHESTER

- June 9 *In a Persian Garden*, a song cycle: music by Liza Lehmann.

### NEWCASTLE

- June 14 A concert from the North-East Coast Exhibition.

On the roof of a community house in Moscow some fifty aerials have been erected for the use of the tenants. Of these, forty-six are owners of simple crystal sets for the reception of the local programmes, and it is stated that their reception is not hampered by the other four possessors of valve receivers!

In the summer-term broadcasts to Scottish schools a prominent feature will be a series of concerts under the general title of "Music We Should Know." Concerts are set apart for the works of Mozart, Grieg, Brahms, Tchaikowsky, and Sullivan, while one will deal with "Music of To-day" and another with "Favourites."

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Case only.

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**3 READINGS ON ONE DIAL! AMAZINGLY ACCURATE AND IS THE IDEAL INSTRUMENT FOR TESTING ELIMINATORS.**

**THE WATES ELIMINATOR VOLTAGE TEST**

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Those who possess Wates Meters are invited to apply at their dealers for this form.

**READINGS**

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- 0-8 VOLTS
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Special Baffle 4/6, Rubber 2/-, Wood lengths drilled 2/6, Heavy Stretching Strips 2/6, Set 2 B.A. Rods, Nuts, Washers 1/6, Irish Linen 7/6, Speaker Dope 2/9, Universal Adaptor with Double Chuck Centre 2/6, Set of 8 Angle Brackets with Screws 2/6.

**THE COMPLETE KIT AS ABOVE 22/6**

Post Free. Any part supplied. Postage extra. SPEAKERS MADE UP COMPLETE IN SPECIAL BAFFLE 37/6. BLUE SPOT, HEGRA, TRITRON UNITS IN STOCK AND FITTED FREE. CABINETS: OAK 35/-, MAHOGANY 37/6. With Cabinet Legs from £4 10s. 0d. Crates and packing free. Stamp brings List.

**THE LINEN SPEAKER SPECIALISTS**

**MOORE & CO. (Est. 52 years), 131/103 DALE ST., LIVERPOOL**

**"A.W." TESTS OF APPARATUS" (Continued from page 808)**

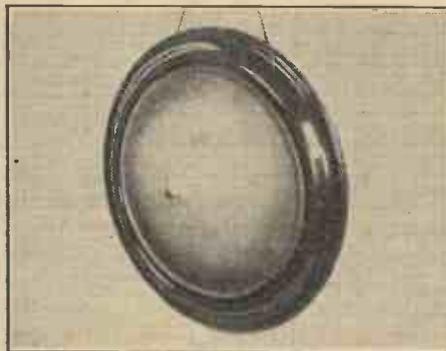
different panel sizes and two heights, and we understand that any slight difference in construction and size can be undertaken at a small extra cost. It should be noted that, in addition to the one illustrated, the Langmore cabinet can be supplied with the battery shelf enclosed back and sides and double doors in front for ros. extra to the prices of the standard models.

All cabinets are fitted with the necessary baseboard, hinged tops, and so on, and ample accommodation is afforded for the batteries. They are highly finished in Jacobean style, and are packed and sent carriage paid to any address in Great Britain.

Manufactured and sold by the Miscellaneous Trading Co., Ltd., samples can be inspected at their 143 High Holborn, London premises.

**New Amplion Loud-speaker**

THE name Amplion has always been associated with high-class wireless apparatus: Messrs. Graham Amplion have used their vast experience in reproducing



A new Amplion plaque loud-speaker—the Guinea model

equipment to produce not only specialised features such as the Amplion Lion, but also good-quality inexpensive types, such as the one-guinea cone speaker shown above.

This speaker, as its name implies, is sold at 2rs., but bears no semblance either in appearance or reproduction to a "cut-price" article. A 10-in. cone of the reinforced type is fitted, and is attractively finished in gold, tapering to a dark colour at the periphery. The outside framework of the speaker is one complete moulding in a brown material, somewhat resembling polished wood. The complete ensemble is distinctly pleasing in appearance.

A simple electric-magnetic unit is employed to drive the cone, with a single knob adjustment. From our tests this appears to be up to standard as regards strength for cone speakers. The quality of reproduction is also commendable, there being no marked resonance at any particular audible frequency.

At a price of 2rs., we consider this speaker is excellent value for money. It is manufactured by Messrs. Graham Amplion, of St. Andrew's Works, Slough, Bucks.

**BLUEPRINTS** Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of all these sets can be obtained at 1s. 3d. and 4d. respectively, post free, "Amateur Wireless" sets and "W.V." sets.

Index letters "A.W." refer to "Wireless Magazine" sets. All Post Free

**CRYSTAL SET (6d.)**

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- A Daventry-Local Crystal Set .. .. AW185

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- Beginners' One-valver .. .. AW 140
- Reinartz One .. .. WM127

**TWO-VALVE SETS (1s. each)**

- East to West Short-wave Two (D. Trans.) .. AW159
- Beginner's Two (D. Trans.) .. AW170
- Auto Two (D. Trans.) .. AW174
- All-Mains Two (D. Trans.) .. AW180
- 1929 Favourite Two (D. Trans.) .. AW186
- Key-to-the-Ether Two (D. Trans.) .. WM107
- Meteor Two (D. Trans.) .. WM114
- Clipper Two (D. Trans.) .. WM135
- Twinflex (Reflex) .. .. WM138

**THREE-VALVE SETS (1s. each)**

- All-wave Mains Three (HF, D. Trans., Rectifier) AW144
- All-purpose Short-wave Three (D, RC, Trans) AW147
- Screen-grid Q Coil Three (HF, D Trans) .. AW150
- All-Britain Three (HF, D, Trans) .. AW158
- Bantam Three (D, RC, Trans) .. AW160
- Hartley Dual-range Three (D, RC, Trans) .. AW165
- Listener's Three (HF, D, RC, Trans) price 4d. free with copy of "AW" .. AW169
- The Binowave Three (D, RC, Trans) .. AW172
- Clarion Three (SG, D, Trans) .. AW175
- 1929 Favourite Three (D, RC, Trans) .. AW179
- Everyday (D, 2 Trans) .. WM52
- All-wave Screen-grid Three (HF, D, Trans.) WM110
- Standard Coil Three (HF, D, Trans) .. WM117
- Festival Three (D, 2LF-dual Imp.) .. WM118
- Wide-world Short-waver (SG, D, Trans) .. WM122
- New Year Three (SG, D, Pentode) .. WM123
- The Q3 (D, RC, Trans) .. WM124
- Lodestone Three (HF, D, Trans) .. WM129
- Simple Screen Three (HF, D, Trans) .. WM131
- Dynamic Three (SG, D, Trans) .. WM136
- At Home Three (D, 2RC) .. .. WM141

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- The Ranger (SG, D, RC, Trans) .. AW145
- Broadcast Picture Four (HF, D, 2RC) .. AW163
- Orchestra Four (D, RC, Push-pull) .. AW167
- All Europe Four (2 HF, D, Trans) .. AW173
- Stability Four (H.F., D, RC, Trans) .. AW182
- "Q"-coil 2 (HF, D, RC, Trans) .. WM71
- Five-pounder Four (HF, D, RC, Trans) .. WM90
- Touchstone (HF, D, RC, Trans) .. WM109
- Reyner's Furzehill Four (SG, D, 2Trans) .. WM112
- Economy Screen-grid Four (SG, D, RC, Trans) WM113
- Binowave Four (SG, D, RC, Trans) .. WM119
- Standard-coil Four (HF, D, 2 RC) .. WM122
- Dominions Four (2SG, D, Trans) .. WM134
- The Drum Major (HF, D, RC, Trans) .. WM137

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- Empire Five (2 SG, D, RC, Trans) .. WM96
- Fidelity Five (HF, D, 2 RC) .. WM130

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- Eagle Six (3 HF, D, RC, Trans) .. WM106

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- "A.W." Gramophone Amplifier (3RC) .. AW162
- Searcher Unit (HF) .. AW176
- Gramophone Amplifier (3 v.) .. AW187
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- L.T. and H.T. Mains Unit (D.C.) .. AW123
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- Arcadian Linen-diaphragm Loud-speaker (Full-size) .. AW177A
- D.C. Unit (HT) .. AW 178
- Short-wave Adaptor (1 v.) .. AW 183
- Universal Short-wave Adaptor .. WM83
- Buzzer Wavemeter (6d.) .. WM121
- H.T. Unit for A.C. Mains .. WM125
- Lodestone Loud-speaker .. WM126
- James H.T. Unit for D.C. Mains .. WM133
- Short-wave Adaptor for Dominions Five .. WM140

**PORTABLE SETS**

- House Portable (SG, D, RC, Trans) .. AW163 1/6
- Arcadian Portable (SG, D, 2 Trans) with linen-diaphragm loud-speaker (half-scale) AW177 1/6
- £5.5.0 Portable (D, Trans.) .. AW181 2/6
- Talisman Portable (SG, D, 2 Trans) .. AW182 1/6
- Holiday Portable Three .. AW188 1/-
- Chummy + (with modifications for L.S. and HT) .. WM301 1/6
- Wayfarer Portable (Super het) .. WM139 1/6

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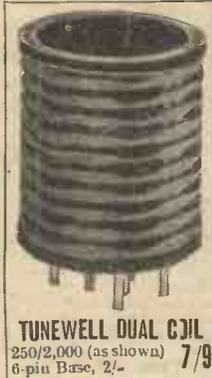
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# TUNEWELL COILS FOR CLEAR RESULTS

**NEW  
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**COILS to  
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3/11 each ;  
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**High Wave  
4/11 each ;  
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FAVOURITE  
TWO  
COIL  
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Base 2/-**

Tunewell coils are suitable for all sets. They are specified in the most popular receivers of the year and have justified that selection.

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## BUILD THE HOLIDAY PORTABLE THREE

with specified parts and obtain the best results. Our kit contains only specified parts and is complete to the last screw.

Price £9 including Cabinet.

Or: 33/4 down and 10 monthly payments of 16/8.  
Blue Spot Unit 66K, 25/- extra  
2 60-volt H.T. Batteries Ever Ready 21/.

### NEW MULLARD S.G.3

The latest in Radio Receiver design. Easily assembled by anyone. Wires cut and looped. Baseboard has plan printed on it. COMPLETE KIT OF PARTS AS USED BY MULLARDS. First payment £1 and 10 monthly payments of 14/- or cash price £7 4s. Complete Kit with 6 Valves, £10 2s.

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A.W. May 18th.

H. & B. Kit of Specified Parts. Complete with Cabinet, C.A.V. Accumulator, Loud-speaker and everything except Valves. Cash price, £11 : 17 : 6 Valves, £2 : 16 : 0 extra.

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MULLARD H.S. SPEAKERS. Usual price, £3 5s. 0d. OUR PRICE, 30/-, or 10/- down and three payments of 7/8. EDISWAN DULGIVOX Speakers. Usual price, £2. OUR PRICE, 19/6.

TALISMAN PORTABLE COILS, as specified by Chapman. 7/6. Screens, 6/- pair.

### GRADUAL PAYMENTS

Carriage Paid on all cash orders. Terms Cash, C.O.D. or Gradual payments as desired. WRITE FOR PRICE LIST.

**H. & B. RADIO CO.**  
34 BEAK ST., REGENT ST., LONDON, W.1.  
Telephone: Ger. 2834

## LETTERS TO THE EDITOR

*The Editor does not necessarily agree with the views expressed by correspondents:*

### The "Favourite Two"

SIR,—My object in writing this letter is that I feel pleased to think that, after twelve months have elapsed, you were still prepared to recommend the "Favourite Two," and it is gratifying to feel that one has not made a mistake in making up the original set.

Only last week two of my friends asked my advice, as they were thinking of having receivers; I advised them to follow my example.

M. (Battersea).

### Condenser Defects

SIR,—I heartily agree with B.F. (Raleigh) about the above. I am also an amateur, and also must express surprise that the manufacturers do not consider the square end spindle, for I have spent pounds on all kinds of dials and even new condensers; but it all ends the same. All have the same fault: the knob will lose its hold. You can twiddle away before it catches. Wake up, manufacturers, and help us!

H. K. (Sunderland).

### Sunday Programmes

SIR,—With reference to my previous letter on the above subject and the reply of M.E.P. (Coventry), may I ask the courtesy of your columns once more to reply to M.E.P.

As far as I can remember I wrote that I must be one of thousands who thoroughly dislike the present Sunday programme arrangements, and I repeat that statement now. To give an example outside wireless, may I quote the simple example of Sunday music in the parks in Liverpool. The "thousands" in Liverpool argued for twenty years before they got their wish in that respect, but M.E.P. would have us believe that the majority are against it.

Again, Mr. Moseley and at least one other writer in AMATEUR WIRELESS have repeatedly written on the point of view which I uphold, as have many leader writers in the daily press.

The satire on my vast circle of acquaintances was quite wasted, since I made no such claim; and even if I had said that my views are held by thousands, I would in all probability have been correct, for I do not so flatter myself as to believe that, in a country of over 40 million people, there are not several millions who have already thought, many times before, everything my brain is ever likely to rise to.

The "majority" of M.E.P. is infinitesimal. Read the daily press and listen to others talking, and see if you can find even "thousands" who are satisfied with the present Sunday broadcasts; then perhaps M.E.P. will realise that it is his turn to

## DOMINION VERNIER DIALS



**BROWNIE** are now producing 2,000 Dominion Vernier Dials a day. That is why it is possible to offer this high-grade dial at the wonderful price of 3/6.

The mechanism is a special non-backlash design with a reduction ratio which makes fine tuning easy without becoming tedious.

Obtainable from all wireless dealers in beautifully finished plain black or lovely grained mahogany bakelite.

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NELSON ST. WORKS

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—this new product is the first plug and socket on the market in which both parts are completely insulated, and, in addition, high and low voltage plugs are not interchangeable, so that valves cannot be burnt out.

Price  
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(Panel portion, 3d. each; flex portion, 6d. each).

Proc. Pat.

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Advt. of Belling and Lee, Ltd., Queensway Works, Ponders End, Middlesex

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The following list is merely representative, and we ask you to fill in the coupon below or send us a list of your requirements.

- HOLIDAY PORTABLE THREE (see this issue). Send 21/-. Balance by instalments.
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## LETTERS TO THE EDITOR

(Continued from page 813)

bow with better grace to the wishes of the majority. S (Bebington).

### Organ Music

SIR,—I was interested to notice in a recent issue a letter from W.E.C. in support of Mr. Edward O'Henry's playing of the cinema organ.

Since my experience, in this case, is founded only on reproduction by means of wireless, I am prepared to admit the possibility of some slight quality of tone being detracted from the original, in process of transmission; but I do not consider that the sounds upon which my criticism is based are to any important extent different from those audible in the theatre. That being so, my listening can be quite as effective and quite as critical as that of W.E.C.

I fully agree that Mr. O'Henry is "a very clever performer"; that, in fact, was the principal cause of my dissatisfaction; but even he appears to have overlooked the fact that it requires special skill to play effectively for a microphone.

J. B. I. (Hawick).

### An Appreciation

SIR,—Having constructed your "1929 Britain's Favourite Three," which I use with a linen-diaphragm speaker, I am forwarding you a list of stations I have received up to date for the benefit of those readers who contemplate building the new "Favourite." All the undermentioned are received at loud-speaker strength: London, Daventry 5XX, Daventry 5GB, Cologne, Hilversum, Radio Paris, Breslau, Frankfurt, Langenberg, Brussels. The above are received in daylight. One morning last week at 1.30 a.m. I tuned in Radio Belgrade on the loud-speaker. A woman announcer gave the call sign "Radio Beograd." Thanking AMATEUR WIRELESS for a fine circuit.

E. L. (Stoke Newington).

A microphone has been installed in the office of the principal of a school at Racine, Wis., so that he may make his announcements simultaneously throughout the school while educational broadcast programmes are being received.

The Berlin studio now contemplates an alternative service of daily broadcast programmes. The Witzleben transmitter and the Berlin-East relay stations in future will transmit a different entertainment to that given through Königswusterhausen.

Mr. George Paton, M.I.Mech.E., A.M.I.E.E., is resigning his position with the B.T.H. Co., Ltd., with which firm he has served for nearly 6½ years.



AND THE

## HOLIDAY PORTABLE THREE

Described in this issue.

The distinctive design, excellent construction, and fine finish of all

## Kabilok Cabinets

is responsible for their being

### SPECIFIED

so often by the designers of Portable and Non-portable receivers.

## BUILDERS OF THE "HOLIDAY THREE"

should insist on their dealers supplying the Specified Kabilok Cabinet. Complete with Internal Aerial Frame, Baseboard, Fret at front and back, H.T., G.B., and L.T. Compartment, Rubber Feet to keep away dampness when placed on the ground and to protect polished surfaces.

Price Complete, as Specified:

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Obtainable from all Dealers.

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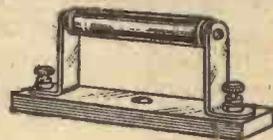
ST. PETER'S WORKS, BATH

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## Ready Radio

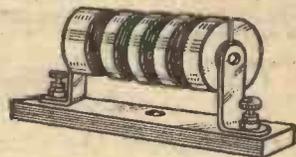
### NON-INDUCTIVE WIRE WOUND RESISTANCES

GUARANTEE: Value within 2%. Current carrying capacity 20 Ma.



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500 to 1,000 ohms	s. d.	2 9
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With holder

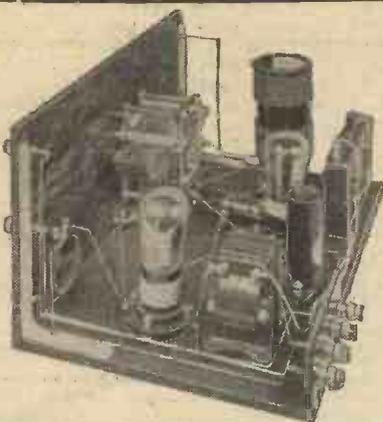
11,000 to 90,000 ohms	s. d.	6 6
100,000 to 250,000 ohms		8 6

Use a Ready Radio resistance in the Holiday Portable Three.

## READY RADIO SUPPLY Company,

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**BRITAIN'S FAV. 2** A.W., 25th  
May 1929

**COMPONENTS UP TO DATE.**  
Ormond .0005, 6/-; .00025, 5/6; 7 ohm Ormond, 2/-; 2 W.B. V.H., 2/6; 6 pin Base, 2/-; .0003 and Series Clip, 1/6; 2 meg. leak, 1/-; H.F. Choke, 5/6; L.F. Transformer, Lissen 8/6; Push Panel Brackets, Bass-Pull, 1/3; Tunewell Dual Range Coil, 7/9.

**14x7 Ebonite Panel, Path former, Push Panel Brackets, Board, Battery Clips, Engraved Terminals, Wire, Mex. Dual.**

**OR READY TO USE INCLUDING DUAL RANGE COIL, POWER & DET. VALVES IN HANDSOME CABINET.** All parts enclosed on Baseboard. (SET IN WINDOW).

**£3.12.6**  
Deduct 10/- if Cabinet not required

**MULLARD S.G.P. 3**  
SEE OUR EXCHANGE OFFER (Applies to this Set ONLY.)

**KIT OF PARTS (IN STOCK)**  
1 Aluminium Panel (ready drilled to carry tuning condensers, switch, reaction condenser, rheostat, and panel brackets) Colvern, 5/6; Juno Piano-board, 2/-; Bebe .0003, 8/-; 2 J.B. Log, left and right, 19/-; Sovereign 50 ohms, 2/6; 2 Drum Dials, pr. 21/-; 2 Six-pin Bases, 4/-; Benjamin Switch, 1/3; 2 E.V. Valve Holders, 3/6 pr.; B.B.C. Aerial Coil, B.B.O. Anode Coil, 9/6 pr.; 1 W.B. Valve Holder, 1/3; 2 Juntun Mounts for 1/3; 4 B. Lee Terminals 2/-; Climax H.F. Choke, 7/6; G.B. Clip, 5d.; Mullard Permacore, 25/-; Metal Screen, 10/6; Panel Brackets, 2/6; 25 T.C.C., 2/3; Mullard .01, 3/-; 7 Plugs, 1/2; 2 Spades, 6d.; Flex and Screws, 1/9; Set of Links, 1/3; Exact to Mullard specification. Long-wave Coils, 10/6 pr. EXTRA.

**Total £6:16:7** POST 1/6

**VERY IMPORTANT NOTICE.** In order to popularize the above set, I am willing to ACCEPT EXCHANGE, in RADIO, GRAMOPHONE or PHOTOGRAPHIC GOODS (provided Kit of Parts as above are purchased). Such exchange in value not to exceed one-sixth of total. Send your cheque less amount you value your goods at. Post your old parts separately with name and address.

Mullard S.G. 22/6. D. 10/6. Pentone 25/- and 4-volt Mullard Speaker Unit 38/6. All H.T. Units, H.T. Batteries and L.T. Batteries stocked. Table Cabinet, 18in. x 7in., oak, hinged lid, 16/11, (post 2/-) for 2/6 with order exceeding £10:0:0 retail. Above Special Offer for CASH ONLY.

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10/6 each.  
Cossor 210RC, H.F., L.F., Mullard PM1A, H.F., L.F., Six-Sixty RC, H.F., L.F., Marconi DEH210, HL, DEL, Osram DEH210, HL, DEL, Ediswan RC, H.F., L.F., 12/6 each.  
Cossor 220P, Mullard PM2, Six-Sixty 215P, Marconi DEP213 (Osram same), Ediswan PV213, 15/- each.  
Cossor 230P, Mullard 252, Six-Sixty 230SP, Marconi 240 (Osram same), Ediswan PV235, Screened Grid, 22/6, Pentodes, 25/-

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**Tunewell Dual** 250/2000 6-pin Base, 1/6 **7/9**  
**PANEL MOUNTING PUSH PULL** 10/6  
**TUNEWELL COILS** for MULLARD S.G.P.3 Aerial or Anode, BBC or Long-wave, 7/10 pair.  
**DUAL C. TAPPED** with reaction  
**AERIAL ANODE 10/6 each.** FOR CLARION (post extra)  
**WEST END DEPOT** for TUNEWELL COILS TRADE SUPPLIED

**VALVES DARIO RADIO MICRO**  
2-v. or 4-v. G.P. ... 5/6  
Super Power ... 7/6  
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Post 3d. (3 Post Free).

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H.F., Det., R.C., 5/2 each; Power, 6/9. 2-v. or 4-v. Post 4d. (10/- Free).

**CLEARTRON**  
SCREEN GRID  
2-volt, 12/8; usual types, 4/-; R.C. or Power, 6/-. Post 3d.

**BE SURE IT'S**  
**BRITAIN'S FAV. 3 (De Luxe)**

A.W. 6/4/29  
Ormond Log .0005, 6/-; .00025, 5/6; 7-ohm panel Rheo, 2/6; 3 Benjamin V.H., 4/6; Formodensar, Type "J," 2/-; .0003 and series clip, 2/-; 2-meg. Leak 1/-; Tunewell All-purpose H.F. Choke, 5/9; R.C.C. Unit Dubilier, 7/-; 50,000 ohms wire-wound, 5/6; 8-mid. Mansbridge, 3/6; L.F. Transformer, R.I. Varley, 15/-; (add balance any other). Push-pull Switch, 1/3, complete with Panel Brackets, Indicator, G.B. Clips, 6-pin Base, Connecting Wire, Thin Flux, 7 Engraved Terminals, EBONITE Panel, 16x8, and 16x9 Baseboard.

**Above Lot 63/-** Tunewell Dual Coil 6-pin 7/9; Lewcos Short Wave, 20/45 or 40/90, 7/6 extra.  
C.O.D. 1/6 U.K.  
For Orders Abroad extra postage, etc., please.

SIEMENS H.T. BATTERIES, 60 v., 8/-; 80 v. Power, 13/6; 108 v., 13/-; 100 v. Power, 22/6; 9 and 4 v. G.B.  
L.T. BATTERIES, Exide D.F. 9, 9/6; Exide D.M.G., 11/-; D.H.9, 14/6; Oldham I.V.D., 9/-; U.V.D., 14/- All with carrier. Carr. extra on Batteries except by arrangement.

**WEARITE**  
Dual Wave Tuner 15/-, H.F. Choke 6/6. S.W. Choke 4/6. 2-way Switch 6/-, 3-way Switch 7/-. Loading Coil 7/6. Titan Coil Unit 15/-.

Ebonite cut while you wait at 1d. square inch, also 1 inch at 3d. Only the best supplied. Drilled Panels for all circuits. Post extra.

**HANDSOME POLISHED OAK SPEAKER CABINETS**  
13 x 13 x 6

**12/11** Post 13  
**BLUE SPOT 25/-**  
66K (101)  
GENUINE ADJUSTABLE 4 POLE BAL. ARMATURE  
**OR CABINET BLUESPOT 35/-**  
12" CONE  
With Trioton Unit 27/6

The Lot Carr. Paid U.K.

**ALUMINIUM CRADLE**  
With fitted 10 in. Floating Cone and 12 in. Square Baffle Board. Takes all Bal. Armature Units.

**7/11** POST FREE U.K.  
If you mention "Amateur Wireless" we will send you as an advt. BLUE SPOT, CRADLE & CABINET  
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(SCREENED GRID)  
KIT OF PARTS "A.W." 9-3-29  
Any other Condenser, H.F. Choke, or L.F. Transformer, supplied by adding balance.

2 Polar .0005, No. 3 at 5/9. .0001 Reaction 4/-, 2 Dual range C.T. Coils, with Reaction (Tunewell), Anode 10 6; Aerial, 10/6, 3 Lotus or W.B. V.H. at 1/3. Formodensar, "J," 2/-, Dubilier 1 mfd., 2/6. .01 Fixed, T.C.C., 1/9, 3-meg. Lissen or Edison Bell, 1/-, S.G. H.F. Choke, Peto-Scott, 5/-, H.F. Choke, Lissen, 5/6. L.F. Transformer, R.I. and Varley, 15/-, Ebonite Strips.  
14x7 Ebonite Panel, Screen, 81x8, 8 Engraved Terminals, Push-pull Switch, Flex, Plugs, 16-g. Wire, 2 S.M. Dials.

**THE LOT 70/-**  
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**ULTRA SHORT-WAVE COILS** FOR COSSOR  
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**BLUE SPOT 66K (101)**  
Adjustable Power Model 4 Pole Bal. Armature THE WORLD'S BEST UNIT.  
**25/-** POST FREE U.K.

**Talisman Portable**

"A.W." May 5, 1929

**LIST OF COMPONENTS**

2 Ormond Log Midget .0002 Variable	16/-
4 Lotus V. Holders, 1/3	5/6
2 Screens, pair	8/-
Dual-range Coil (W.W.)	7/6
15-ohm Rheostat	2/-
Dubilier, 2 mfd.	3/6
2 Do. 1 mfd.	5/6
T.C.C. .0005 S/P	2/6
McMichael H.F. Choke	4/6
30,000-ohm Anode and Holder	3/6
Igranite "J" L.F. (17/8)	35/-
2 H.T. Stoppers 5/6	11/-
"Grawor" L.S. Unit (as specified)	16/6
Tuning Chart	2/-

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**YOU CAN BUY** All necessary Plugs, Spades, Screws, 100 ft. Frame Aerial Wire, Switch, L.T. do. Terminals, Connecting Wire, Ebonite Panel (14x6, drilled) (Any other size at extra charge). 2 Slow-motion Dials, Red and Black Flex. 32 d.s.c. Copper Wire, 2 Grid Bias 9 volt, Plug and Socket.

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A Wireless Handbook and Glossary for Ninence, post free, is made possible by the fact that we have a few copies left on our hands, of the AMATEUR WIRELESS Handbook and Diary, 1929, and while we are quite aware that not many people will wish to buy a diary in the middle of the year, yet they will be rather glad, we think, of an opportunity of acquiring a remarkably useful collection of wireless data at a nominal price. The 1s. 6d. edition (cloth) we are selling at 9d., post free, and the 2s. 6d. edition (leather) at 1s. 3d., post free. We offer it, not of course as a diary, but as a compilation of helpful data, these including symbols, contractions, tables of conductors, insulators and resistance wires, aerials and earths, frame aerials, wave-lengths and frequencies, accumulator charging and upkeep, coil winding, useful formulae of many kinds, broadcast-receiver circuits and operation, lists of stations, lists of valves and, finally, a glossary of no less than 350 wireless terms (a splendid little dictionary of simple phrasing)—all for 9d., post free, cloth, or 1s. 3d., leather, from AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4.

At a recent meeting of the Italian Broadcasting Council it was decided to erect a new 20-kilowatt transmitter at Milan and to raise the power of the Naples station to 7 kilowatts. Italy is anxious that her operatic and other musical entertainments should be heard throughout Europe.

Although up to the present a regular programme of picture transmissions has not been organised, tests are made daily by Radio Paris towards 6.15 p.m. B.S.T. Rome also transmits on Mondays and Saturdays between 10 and 10.18 p.m. on the Fultograph system.

"Amateur Wireless and Radiovision." Price Threepence. Published on Thursdays and bearing the date of Saturday immediately following. 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 "Bernard Jones Publications, 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," 58-61 Fetter Lane, London, E.C.4.

### PREPAID ADVERTISEMENTS.

Advertisements under this head are charged THREEPENCE PER WORD, minimum charge THREE SHILLINGS.

#### DEPOSIT SYSTEM

As the Publishers cannot accept responsibility for the bona fides of advertisers in this publication, they have introduced a system of deposit which it is recommended should be adopted by readers when dealing with persons with whom they are unacquainted. It is here explained.

Intending purchasers should forward to the Publishers the amount of the purchase money of the article advertised. This will be acknowledged to both the Depositor and the Vendor, whose names and addresses must necessarily be given. The deposit is retained until advice is received of the completion of the purchase, or of the article having been returned to and accepted by the Vendor. In addition to the amount of the Deposit, a Fee of 6d. for sums of £1 and under, and 1s. for amounts in excess of £1, to cover postage, etc., must be remitted at the same time. In cases of persons not resident within the United Kingdom, double fees are charged.

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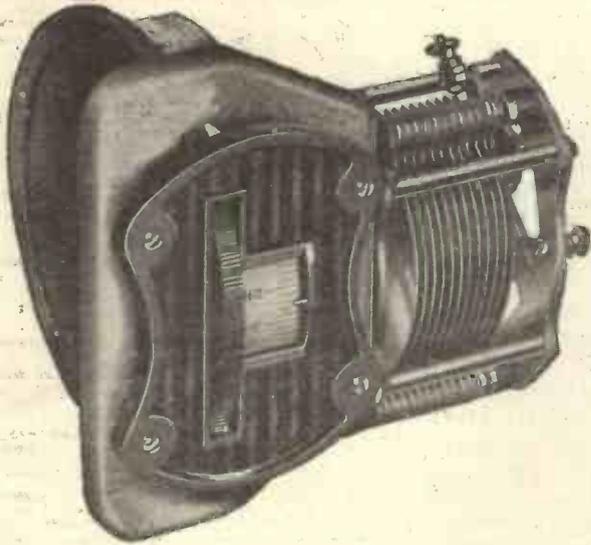
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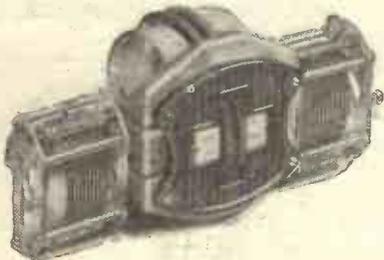
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*This Dial will give your set the expensive look friends will admire*

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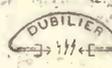
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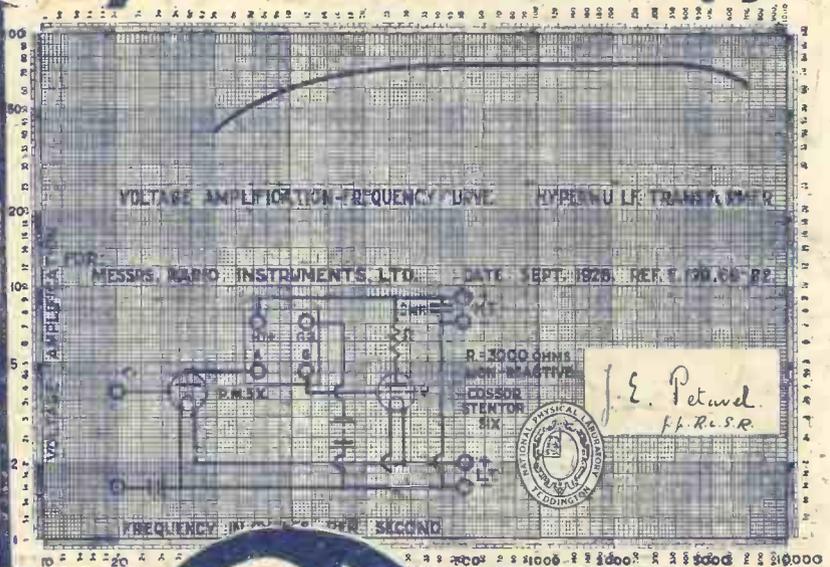


Dubilier Condenser Co. (1925) Ltd., Ducon Works, Victoria Road, N. Acton, London W.3.

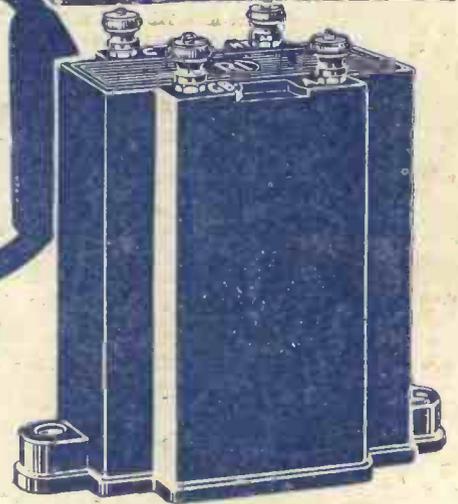
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