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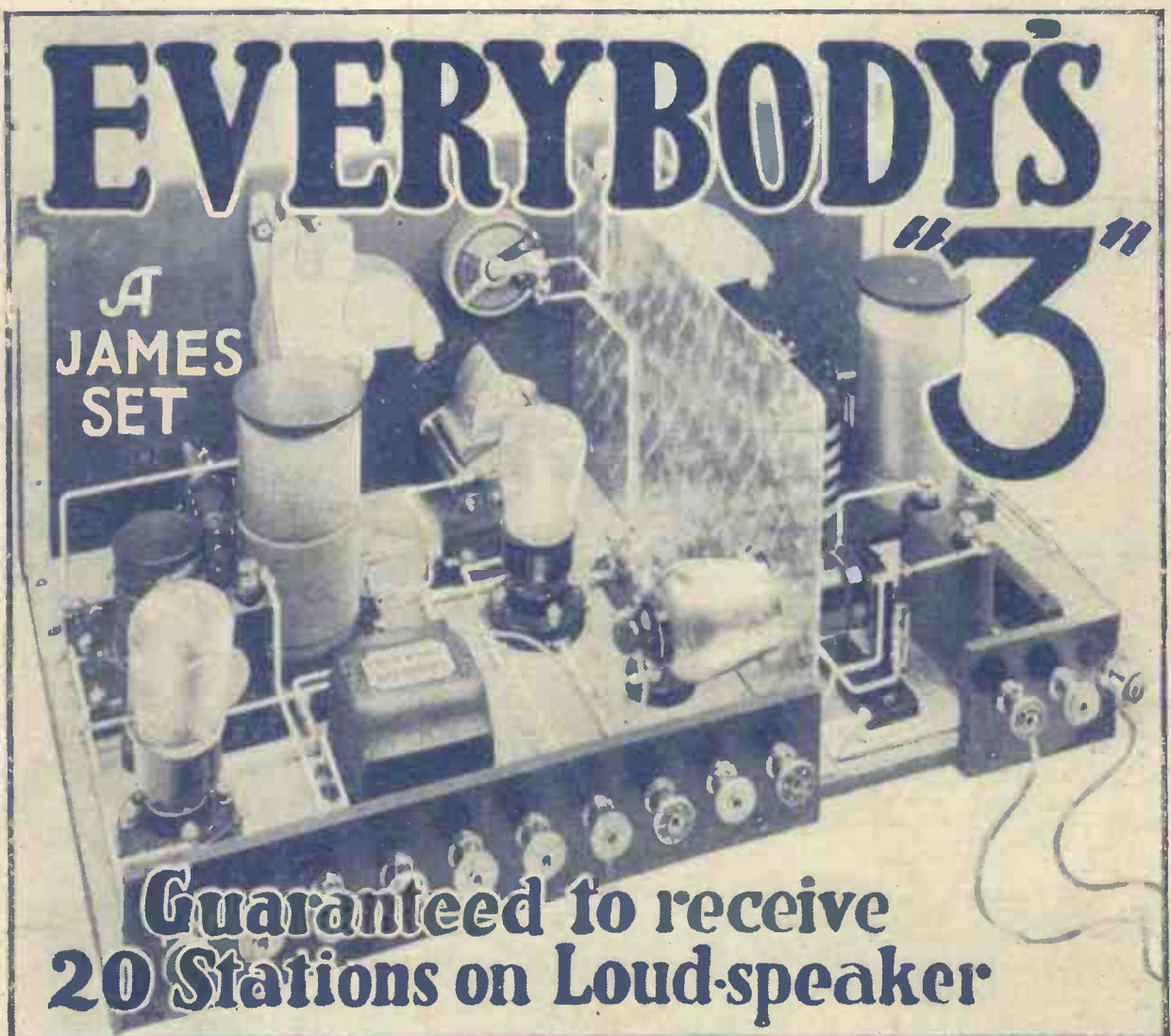
Vol. XV. No. 390

Saturday, November 30, 1929

## EVERYBODY'S

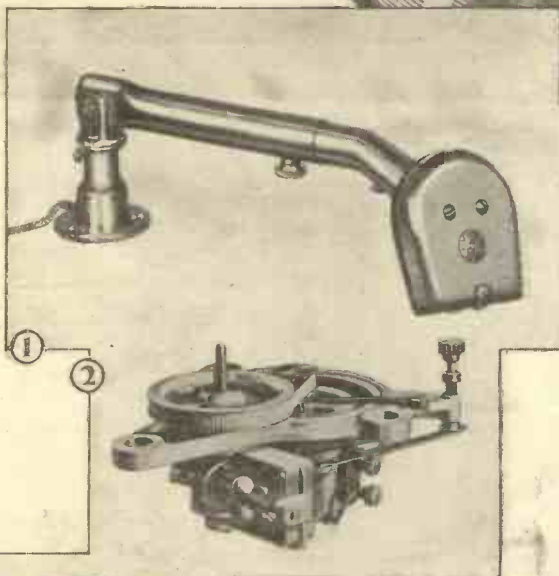
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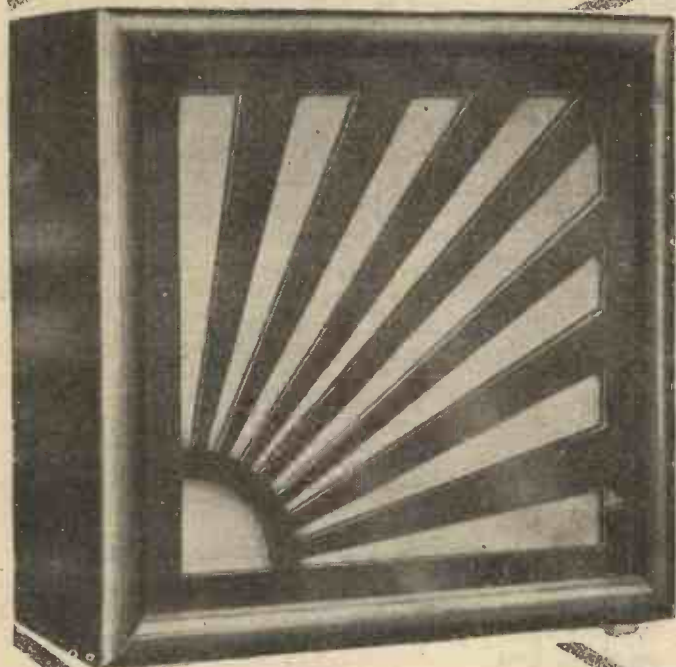
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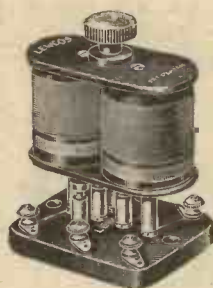
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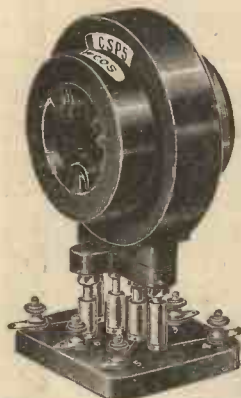
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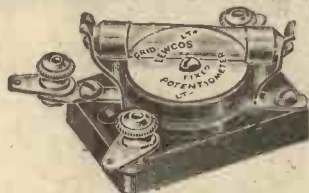
### The Lewcos H.F. Choke

An extract from an appreciation from Industrial Progress (International) Ltd., reads: "The Lewcos H.F. Choke is, in our opinion, the most efficient Choke we have tested."



### The Lewcos Dual Unscreened Coil

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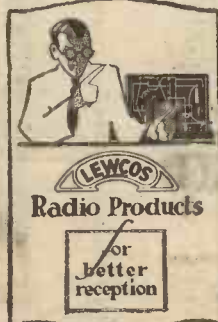


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# Amateur Wireless and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

Editor: BERNARD E. JONES

Technical Editor: J. H. REYNER, B.Sc., A.M.I.E.E.

Research Consultant: W. JAMES

Assistant Editor: H. CORBISHLEY

## The New Brookmans Park—The "Palace" Broadcasts—No Kipling—Trouble in the States!—That Television Bugbear—Our Christmas Issue

**The New Brookmans Park**—Have you heard the second transmitter at Brookmans Park yet? This is occasionally to be heard working at "off" hours of the day. The B.B.C. tells us, though, that matters are not yet quite complete, and the two transmitters won't be working together till about next February.

**No Politics, please!**—Mr. Winston Churchill will be installed as Chancellor of Bristol University on December 13, and it is expected that his address will be relayed through Daventry 5XX as well as Cardiff.

**The "Palace" Broadcasts**—With Solomon as soloist and Sir Landon Ronald as conductor, the next B.B.C. concert at the People's Palace, on December 5, should prove one of the most popular of the season. These People's Palace broadcasts are really good, as we had occasion to remark at the beginning of the last season. Last week our radio critic said anent these concerts: "I advise any listener who wants to see as well as hear a cheap and good evening's entertainment to go to the Mile End Road. The bus passes the door."

**No Kipling**—So we are not to hear Kipling after all, for the B.B.C. announces the cancellation of the proposed broadcast of a speech by Mr. Rudyard Kipling from the annual banquet of the United Associations of Great Britain and France in London on December 12. Mr. Kipling has been ordered abroad for health reasons and will, therefore, be unable to attend the function. Instead, we are to have speeches by Lord Derby, Mr. Arthur Henderson, M.P., and the French Ambassador, M. de Fleuriau.

**Trouble in the States!**—"Return of favourable radio reception conditions indicates that with the utilisation of the screen-grid tubes possessing such high amplification factors, the Federal Radio Commission has still a considerable problem before it is completing the re-assignment of stations so that heterodyning may be further reduced, if not eliminated. Scores of stations of comparatively weak



A peep inside the van used for detecting oscillators. It is now touring Scotland—so tune with care!

power are now coming through. Stations quite far apart simultaneously using a common wavelength are noticeably clashing." So says one of the most prominent set manufacturers in the States, Mr. Alfred H.

Grebe. The comments on American broadcasting made in AMATEUR WIRELESS, when two of its staff members made a U.S. tour last summer, are now really proving true. The States seems to be having a kind of Prague Plan bother of its own.

**That Television Bugbear**—It is generally reckoned that a radio television transmission must take up a wider frequency band than a normal telephony transmission. But now we hear that two Chicago radio engineers, Prof. L. P. Garner and U. A. Sanabria of the Western Television Corporation have developed an experimental television system requiring only about half the usual waveband formerly believed necessary for good radio picture transmission and reception.

**A Giant C.N.R. "Hook-up"**—The Canadian National Railways will give twenty-five national broadcasts this winter over its new Atlantic-to-Pacific wireless "chain." This is the most ambitious programme so far attempted in Canada. It involves the use of sixteen stations, stretching from Halifax, N.S., to Vancouver, and approximately 15,000 miles of land line. Some conception of the engineering difficulties involved in giving effect to the scheme may be gained from the fact that five different time zones are covered, each representing a difference of one hour.

### Our Bumper Christmas Issue

—Whatever you do, don't miss our Finest Christmas Special Number, on sale Thursday next. It will be the usual price—3d.—so the special features and extra pages will be a kind of advance Christmas present to "A.W." readers! This issue will be full of splendid fare—articles by John L. Baird, Tommy Handley, Baynham Honri, Captain Round, R. W. Hallows, T. Thorne Baker, J. Godchaux Abrahams, to mention only a few. Now turn to page 866, where are given preliminary notes by the designers of the simplest, newest, and most satisfactory "three." And make sure of your copy of next week's issue!

### PRINCIPAL CONTENTS

	PAGE
Current Topics .. .. .	865
Designing the "1930 Ether Searcher" ..	866
The Beginner's One-valve L.F. Amplifier ..	867
"A.W." Visits PCJ .. .. .	869
On Your Wavelength .. .. .	875
Your Aerial and Selectivity .. .. .	877
Without Fear or Favcur .. .. .	879
"Everybody's 3" .. .. .	880
Those "O.B.'s"! .. .. .	884
My Wireless Den .. .. .	886
"A.W." Tests of Apparatus .. .. .	888
Radiograms .. .. .	890
Letters to the Editor .. .. .	894
Our Information Bureau .. .. .	897



# DESIGNING THE "1930 ETHER SEARCHER"

*How Messrs. Sieger and Hunter of our Technical Staff Tackled a Big Problem*

**F**OLLOWING our preliminary remarks last week, many AMATEUR WIRELESS readers—especially those who built the original "Ether Searcher"—will be looking forward to more details of our new set, the "1930 Ether Searcher." First of all, we must make it clear that the new set is entirely new, retaining nothing of the original "Ether Searcher" design.

We did start with the original set and endeavoured to produce a modification that would meet present-day requirements; readers would be astonished if they knew of the many changes that have been involved before the final design took shape! In the beginning, we tried to get the listener's point of view; in doing so we concluded that what the average reader requires to-day is good quality reproduction from a number of stations, with ease of control and cheapness of both initial cost and maintenance cost.

The photograph on page 810 of last week's AMATEUR WIRELESS shows us at work on one of the many designs tried before the final one was decided upon. We have had to collaborate with manufacturers of coils and tuning condensers to achieve our ideals. As a result, readers will be able to obtain accurately-matched pairs of coils and a real precision tuning condenser, at prices so reasonable that no one need be debarred from building the set, however modest his purse may be.

## Low Cost

To keep down the initial cost of a set involves a very careful survey of the manufacturers' products; even when a suitable selection of parts have been obtained, it is by no means easy to get them to work well together. It is, in fact, one of the chief functions of the set designer of to-day to try out different selections of component parts in order to give readers satisfactory combinations.

In the interests of ease of control, we tied ourselves down to one-dial tuning, for some time we tried to make use of a circuit

consisting of a detector and two low-frequency amplifying valves, as was used in the original "Ether Searcher." Two designers seldom agree about any given set, but we are both agreed that, try as we might, it is only possible to build a satisfactory three-valve set for 1930 conditions if a stage of high-frequency amplification is incorporated. The immediate complication confronting us was the necessity for two

of a turn; we journeyed out to Romford to make quite certain of this. The coils lend themselves to a remarkable control of selectivity and to a simplicity of wavelength changing that has never yet been equalled. To tune these coils we needed an equally accurate product of a condenser manufacturer. We are using the new Formo gang condenser, the two sections of which are matched to within 1 per cent. of

each other. The mounting is simplicity itself, as our blueprint next week will show. Both coils and condenser, in spite of their precise accuracy, are extremely cheap to buy.

## Simple Construction

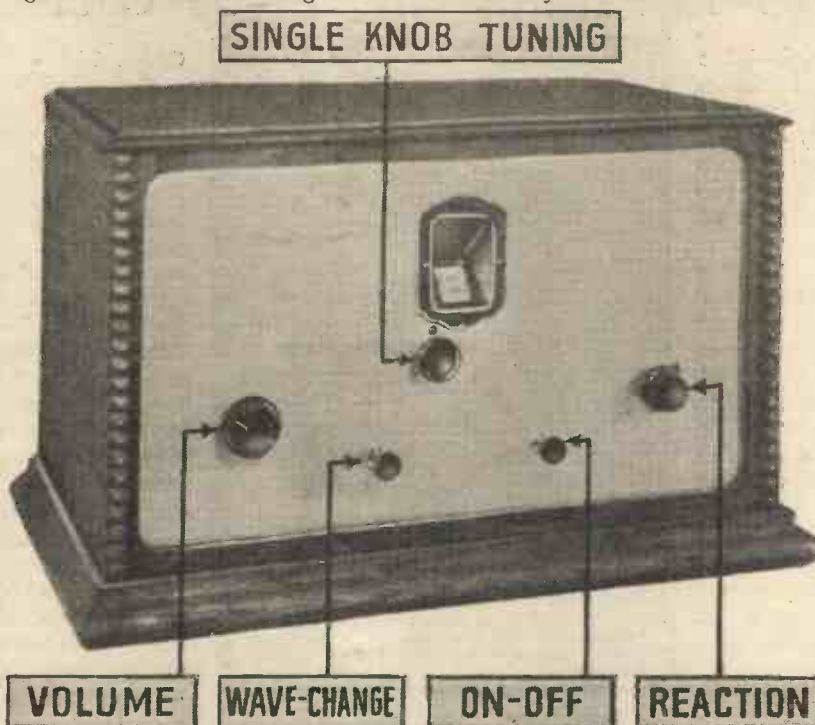
In the constructional work of the "1930 Ether Searcher," the AMATEUR WIRELESS reader can enjoy a new experience in simplicity; we are using an all-metal chassis, consisting of a finely-finished metal panel, supplied already drilled by the makers, a metal base, also ready drilled, and a simple cross-section screen. The advantage of this new system of construction will be readily seen in the greatly reduced number of connecting wires.

The wiring itself follows a different plan from that usually adopted in AMATEUR WIRELESS sets; by following a few simple instructions, the constructor will be able to do the complete wiring in a much shorter space of time than has previously been possible.

Some of the results that can be expected from the "1930 Ether Searcher" have already been ascertained, Brookmans Park can be cut out within three degrees of its maximum tuning point. This exceptional selectivity has not been obtained by sacrificing sensitivity, for by turning the single tuning knob a few degrees, distant stations come tumbling in, one by one, right round the scale. Hardly any adjustment is needed for the reaction condenser; it is simply a matter of turning one knob.

Every listener knows that the local station is very much louder than any other

(Continued on page 900)



This picture gives a general idea of the "1930 Ether Searcher," but the panel hides many unique features of a remarkable set. Note, however, the clean appearance and the absolute simplicity of control

tuned circuits; it became clear that, if we were to retain single-dial tuning, some form of ganging would be essential.

Constructors are usually unfavourably disposed towards ganged tuning; one reason is the expense of the gang condensers and another reason is the difficulty of mounting. Still a further difficulty in ganging has been in the matching. We claim to have entirely eliminated all the difficulties associated with gang condensers, at the same time gaining the tremendous advantage of single-dial control of two tuned circuits. In effect, the reader will have all the simplicity of operation of the original "Ether Searcher," with the amazingly sharp tuning of two accurately-matched tuning circuits.

The new Collinson tuning coils are scientifically matched to within a fraction

**Full Details of the "1930 ETHER SEARCHER" IN NEXT WEEK'S SPECIAL CHRISTMAS NUMBER**



IT is a significant fact that the trend nowadays is towards simpler sets. At one time there was a demand for sets having two and even three high-frequency stages, and super-hets were popular for quite a while.

But now, probably largely owing to changes in transmitter technique, the number of valves necessary for good reception is being reduced, and, as has been stated often in the pages of AMATEUR WIRELESS, the three-valver is the most popular type of receiver used to-day.

That is not all, however. The coming of high-power large-service-area stations, such as Brookmans Park, has resulted in yet another change in the popularity of certain kinds of receiver. The crystal set will again become immensely popular. Of that there seems little doubt. Again, one-valve sets, such as the B.B.C. officially recommended one-valver described the week before last will have an increasing use, for receivers of this type will enable the local high-power

## THE BEGINNER'S ONE-VALVE L.F. AMPLIFIER TO ADD TO YOUR CRYSTAL OR ONE-VALVE SET



"crystalites" and "one-valveites."

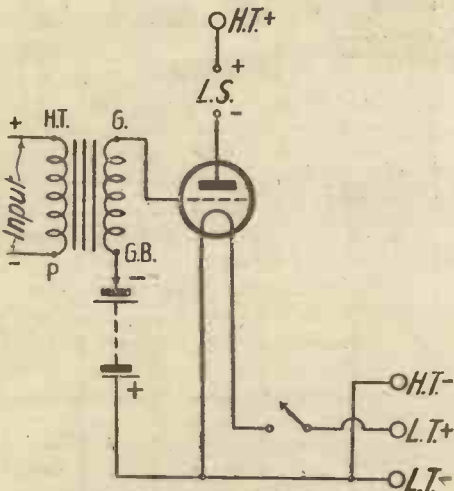
The "Beginner's One-valve Amplifier," here described, is purposely made as small, compact, and simple as possible, so that it may be slipped into a corner near the set, or near the loud-speaker, and will not really necessitate a proper cabinet.

It is made up simply on a small baseboard, measuring  $5\frac{1}{2}$  in. by  $4\frac{1}{2}$  in., and has an ebonite strip carrying terminals and an on-off switch attached at one side.

The circuit is quite simple to follow, and is shown in the usual symbols in the accompanying diagram on this page. A transformer is used to couple the amplifier to whatever is the preceding stage, valve

or crystal. This is simpler than an R.C. coupling arrangement, which has to be modified for various coupling necessities. The secondary of the transformer is connected to the grid circuit of the amplifier valve, and grid bias is, of course, used, so that a valve of almost any output capacity can be employed. The grid-bias battery is included in the amplifier unit, so that if the amplifier is used with the B.B.C. recommended one-valver, for instance, it is necessary to take leads only to the H.T. battery and the accumulator.

In the accompanying list are given all the parts necessary for making up this simple little amplifier. The first-mentioned parts are those used in the original design. Also are given alternatives which can be used with the smallest possible modification of the design.



The Amplifier Circuit

station to be received without "forcing," and will also ensure good reception from at least one alternative transmitter; and probably more than one in a number of instances.

It must be quite clearly understood, however, that the single-detector type of set followed by no low-frequency amplification will not enable a loud-speaker to be operated.

Probably right under the shadow of Brookmans Park it may be found possible to connect a loud-speaker in the anode circuit of the "Brookmans Park One-valver" and to get loud-speaker reception of a kind;

but this reception must be regarded only as a "fluke," and not at all the kind of thing that can be done by all within the service area of a station such as the London Regional.

### COMPONENTS REQUIRED

Low-frequency transformer (Lotus 5-1, Lissen, Telsen)  
Valve holder (Benjamin, Lissen).  
Push-pull filament switch (Bulgin).  
Ebonite terminal strip,  $5\frac{1}{2}$  in. by 2 in. (Beco).  
Four terminals marked: Input+, Input-, Output+, Output- (Belling-Lee).  
Four wander plugs marked: H.T.+ H.T.-, G.B.+ G.B.- (Belling-Lee).  
Two spade tags marked: L.T.+ L.T.- (Belling-Lee).  
Grid-bias battery clips (Bulgin).  
Six feet of thin flex (Lewcos).  
Connecting wire (Glazite).  
Baseboard  $5\frac{1}{2}$  in. by  $4\frac{1}{2}$  in. (Pickett).

A number of listeners who use phones in conjunction with a crystal or a valve set will, no doubt, have an occasional wish for loud-speaker reception, particularly when friends are invited to listen and one or two pairs of phones have to be shared!

What is really needed, therefore, is a little amplifier which can be added on occasions without complicating the receiver itself. The addition of the amplifier will enable the set to work a loud-speaker properly, and without forcing the degree of amplification.

There are numerous other uses, too, to which such a single-valve amplifier could be put—say in connection with a single- or two-valve short-wave set—and it is, therefore, possible that it will be made up by many owners of existing large sets, in addition to the ever-increasing army of



Here is the complete amplifier ready for use



# THE NORTH REGIONAL STATION

AFTER Brookmans Park, Moorside Edge. The North Regional station, the second of the B.B.C.'s twin-wave high-power stations, is now in the first stages of its construction at Moorside Edge, near Slaithwaite, Yorkshire. This station will be similar to that at Brookmans Park and will serve the whole of the north of England (with the exception of the Newcastle area), and a large part of the northern Midlands and North Wales.

The B.B.C. engineers have had to overcome very considerable difficulties in selecting a site for the North Regional station. Work commenced last Christmas with the mobile transmitting and receiving stations. Before these stations (mounted on motor lorries) could set about the work of testing, however, a large number of suggested sites were inspected and considered from such view-points as sub-soil, water supply, surroundings, and availability for purchase. Four of the sites were eventually selected for thorough technical investigation by the mobile stations. They were:—

1. Todmorden Moor, which was abandoned

on account of a peculiar difficulty arising in connection with the purchase, apart from all questions of price;

2. A site near Rochdale which was found to be unsuitable technically, owing to the fact that there were undue electrical losses;
3. A low-lying site near Heywood which was tested mainly in order to compare the effect of the sites at greater altitudes;
4. Moorside Edge, which was eventually selected.

The transmissions from the mobile transmitter were picked up in various parts of the north of England by the mobile receiver. The field strength was carefully measured and from the measurements a polar diagram was prepared to show the amount of energy sent out in every direction. In the case of the Rochdale site, the polar diagram showed that that site would be inefficient.

Owing to the large number of measurements necessary, and the consequent enormous number of miles to be travelled by the receiving van, the transmitter stayed from four to six weeks on each of

the four sites, but owing to various delays the investigation was not concluded until June. The Todmorden Moor site, between Bacup and Todmorden, was absolutely suitable, but after the engineers had concluded their work a hitch occurred.

Three engineers, as well as motor drivers, were engaged on this work regularly from Christmas to June. They frequently had very serious difficulties to encounter, owing to the weather. While they were testing the Todmorden Moor site the weather was very severe. The aerial was blown down several times and the transmitter lorry was almost buried in snow drifts. The lorry is very heavy and on several occasions there was great trouble in moving it owing to frozen roads. On one occasion, the lorry got hopelessly bogged and a contractor who was called in to help to extricate it met with an accident and sustained three broken ribs.

The Moorside Edge site is 1,000 feet above sea level, which is considered about right, taking everything into consideration. The tests from this site gave satisfactory results, the polar diagram being reasonably symmetrical.

## "THE BEGINNER'S ONE-VALVE AMPLIFIER"

(Continued from preceding page)

On this page is given a reproduction of a blueprint which has been made out to assist constructors. This print shows every part full size, and gives all the wiring in a very easy form, so that you simply can't go wrong. If you are an experienced constructor, then you will possibly be able to make up the unit from the photographs here given, and the written description; but if this is one of your initial attempts at construction, and perhaps your first acquaintanceship with anything incorporating a valve, then don't take risks. Get

the full-size blueprint and copy the construction exactly.

### Construction

The ebonite strip should be drilled first, to take the four terminals and the filament on-off switch. Don't forget, too, that two little holes have to be drilled so that the strip can be screwed to the wooden baseboard.

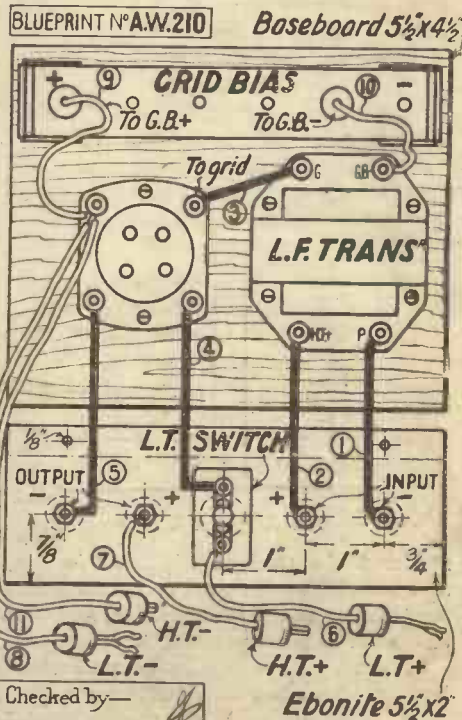
Wood screws should be used for fixing the valve holder, transformer, and grid-bias battery clips to the baseboard. The correct positions of these components are clearly given in the blueprint. The wiring is shown, and those who care can also follow the theoretical circuit.

The valve to use should be an ordinary low-frequency valve, a power valve, or a super-power valve, according to the work which the amplifier has to do.

An L.F. valve is only suitable if phones are to be used—at great strength, of course. A small power valve, such as the DEP210, is best used for working most ordinary types of loud-speaker, while if the input to the amplifier is fairly considerable and a correspondingly greater output is required, say for a number of speakers, or for a moving-coil job, then a valve such as the power "220" or "230" type

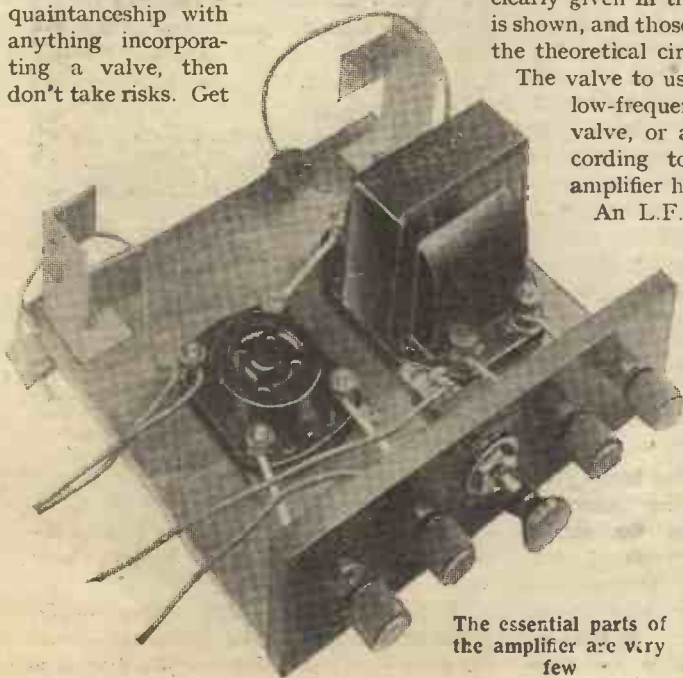
is best used. The greater filament current is a sign of a greater emission than is the case with the "210" type valves.

A voltage of less than 100 is not recommended. Anything up to about 150 can be



The wiring diagram. Blueprint available, price 9s.

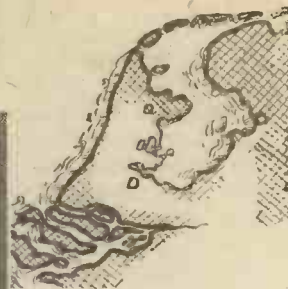
used with advantage, and the grid bias must be varied in accordance. The full 9 volts will generally be needed with 120 volts H.T., and these values with a "210"-type valve form a very good combination.



The essential parts of the amplifier are very few



# "A.W." VISITS PCJ

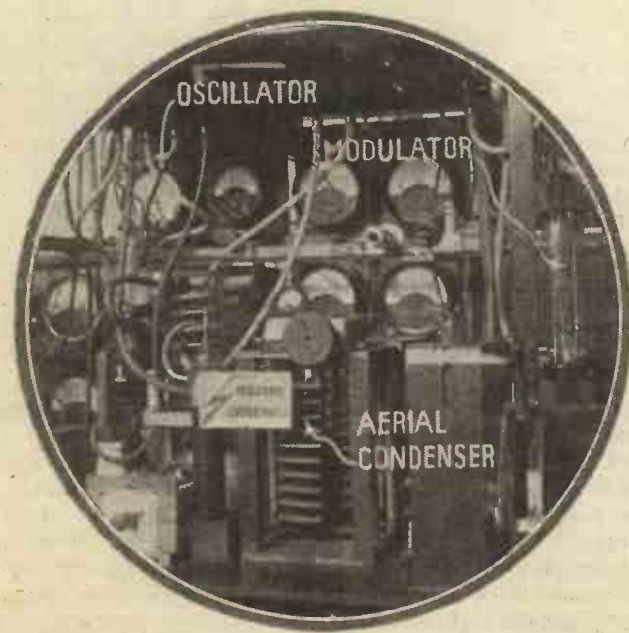


THE title of this article, I understand, is to be "A.W. visits PCJ." Actually, it wasn't half so impressive as that!

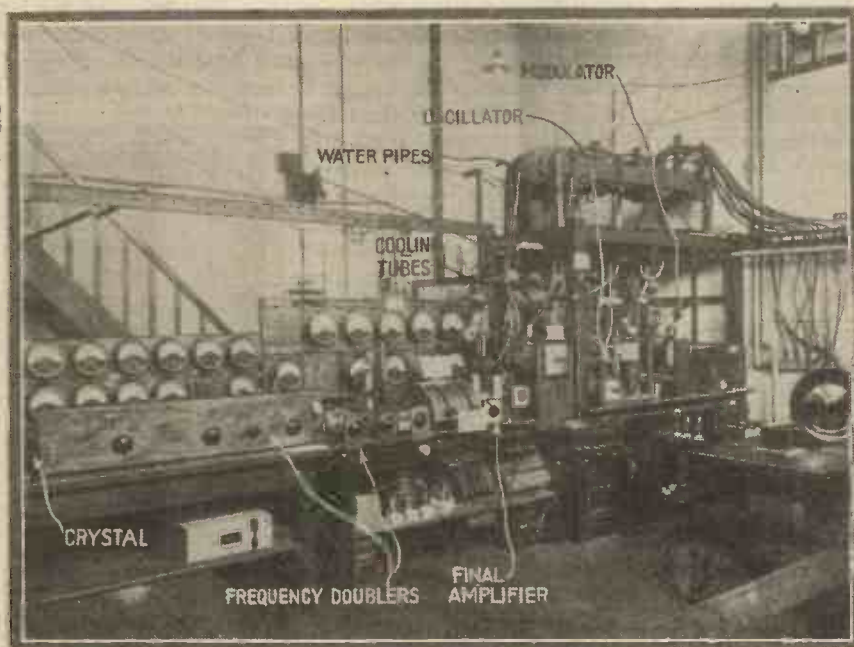
What really happened was that I found myself at Hilversum in a taxi one wet night a week ago, trying to find the studio of the world-famous short-waver PCJ. PCJ is, of course, run by that giant manufacturing organisation Philips, of Holland. The multi-language announcer there is world famous and this station is one of the loudest "noises" we have on the short-wave band.

Therefore it was with unusual interest that I eventually arrived at the studio. For the purpose, Philips have taken over a small private house, carrying on a neat plate, the name "My Home."

In one of the rooms is situated the control apparatus and amplifiers, another forms a cosy waiting-room for artistes, a third houses a large library of gramophone records and an electric gramophone, while a fourth forms the studio itself.



Here are the water-cooled oscillator and modulator valves



View of the transmitter section of PCJ

I arrived at PCJ about half an hour before closing time and saw the control man at work, and, while waiting for the announcer-cum-director, Mr. Startz, to be free, listened to the programme being broadcast through a moving-coil speaker. What a strange feeling it is to know that a station which you have always regarded as a distant one is right at your elbow and literally shouting in your ear! But I wasn't really at PCJ, for the transmitter itself is in a large building about five minutes' walk away across the fields.

The control amplifiers and controls are the envy of anybody who takes an interest in the L.F. side of his set. Philips really do things very thoroughly, and even the low-frequency amplifiers are encased in metal. Where meters are used they are placed *inside* the metal boxes, and small holes are cut so that a very minimum of the dials is visible.

A potentiometer-fader control is used just as in B.B.C. practice, and the control man was busy with this and other knobs all the time that the broadcast was going on.

Through the loud-speaker I heard the announcer "putting on the air," in English, French, German, Dutch, and Portuguese, a greeting and an intimation that some gramophone records would be given.

This left him free for a while to show me round the station; but first came the blow! An hour previously it had been announced that I would give a speech; so I was really "let in for it," and had to make an impromptu ten-minute talk to all the British-speaking listeners of PCJ. No easy matter, I can assure you! The studio is unnerving. It has the old-fashioned grey hangings

and drapings, which alter the echo period so that it sounds as though one is speaking out in the open air. Anyway (I hope to the credit of AMATEUR WIRELESS), I did my little bit with the assistance of some friendly badinage with the announcer!

Then for the remainder of the English hour I watched the method of "putting over" the entertainment from PCJ. Its listeners really do get a good programme



Mr. E. Startz, the five-language announcer at PCJ

service. The purpose of the station is mainly to act as an experimental *poste* for Philips, and much valuable pioneer short-wave work is done there.

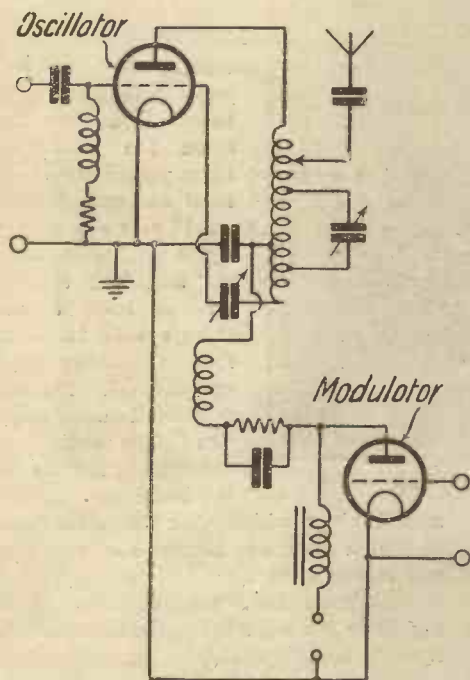
In the PCJ office I saw a map studded with little flags showing that reports have been received from points as far distant as



Vancouver on the far coast of Canada, and Auckland, Christchurch, and other places on the distant islands of Australia. Literally, PCJ does cover the whole world, and, considering that it has a rated power of 25 kilowatts and works on 31.4 metres, this is really remarkable.

It may interest you to know that the programme schedule is a comprehensive one, and the station can be heard working every Thursday and all over the week-end.

The schedule is as follows: Thursday,



A skeleton circuit of the PCJ transmitter

7 to 9 p.m., in English; 12 midnight to 1 a.m., in Spanish. Friday, 1 to 2 a.m., in Portuguese; 2 to 4 a.m., in Spanish; 7 to 9 p.m., in English. Saturday, 1 to 2 a.m., in Dutch; 2 to 5 a.m., in English, French, and Spanish; 5 to 7 a.m., in English.

You have heard the metronome from PCJ? It is given in a very simple manner by placing a small "met." on top of the microphone itself, and the announcer sets it going directly he stops speaking. The control man below fades in this effect, and also fades it out when the electric gramophone is started.

#### When the Queen Broadcast

PCJ gives many gramophone-record broadcasts, and I suppose this fact might make some people turn up their noses at the idea of receiving "canned" music. But Philips have special pick-up and amplifier arrangements which make it absolutely impossible to tell when, say, the station dance-band session ceases and "jazz" gramophone records are put on. Also, at "My Home" there is a library of some thousand or so records, arranged so that programmes can be given in many European languages and of almost any degree of high-brow or low-brow-ness.

The studio itself is large enough to accommodate a small orchestral combina-

tion, and has been graced by the presence of H.M. the Queen of Holland and H.R.H. Princess Juliana, who broadcast from PCJ shortly after the station first "worked" the Dutch East Indies in 1927. I spoke through the same microphone as H.M. the Queen, so I am doubly honoured.

Before leaving the studio I (as a keen short-wave enthusiast) begged to be given a rough "hook-up" of the transmitter circuit, and this little sketch is reproduced herewith. The modulation is very good, and I am assured that the circuit is an easy one to work. "Fans," please note!

Then off we trudged in the dark through the fields, the only faint glimmer of light coming from a glowing neon-sign on the mast of the Hilversum long-wave broadcaster, to which one end of the PCJ aerial is hitched: no elaborate short-wave aerial arrangement—just a short length of wire!

#### The "Sender"

A large building, from which came the hum of generators and raucous sounds of the broadcast programme, put at blasting strength over a loud-speaker so that the engineers can hear above the noise of the transmitter, acted as its own signpost in the darkness; and so we entered PCJ itself.

Again I had a real thrill, for to a radio enthusiast it is good to stand at the side of the humming dynamos and glowing "tubes" of a station which you have previously known as hundreds of miles away, and which, while you watch it, is giving music to regular listeners all over the world.

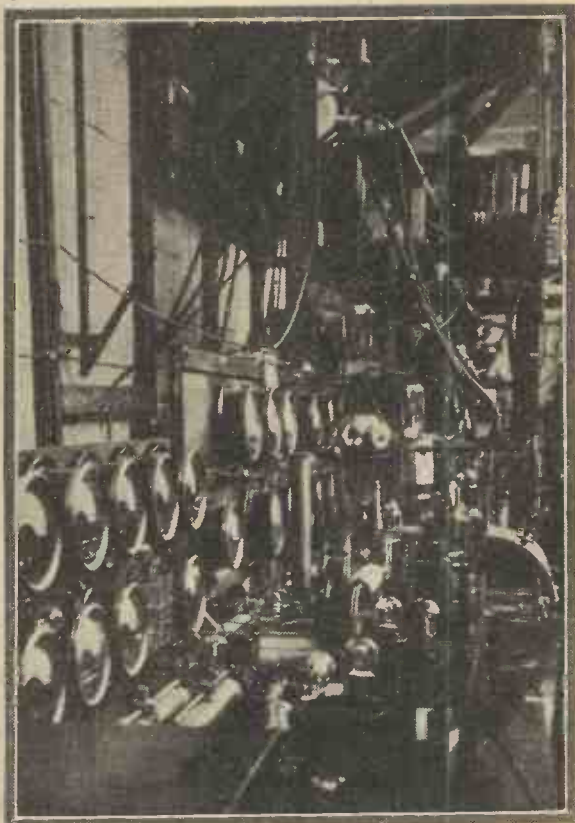
The whole atmosphere is one of the laboratory. The piezo control crystal is contained in a constant-temperature metal box about three feet each way, slung from the rafters and having thermometers projecting from it at awkward angles. The large electric-motor-driven water pumps needed for pumping the cooling water for the valves aren't the things one usually associates with a radio transmitter. Philips water-cooled valves are used for the large-power and modulators stages.

Two engineers sat at a little table in front of the main section of the transmitter. One watched coloured lights which glow in an indicator panel, and had at his hand a main switch to cut off all the power in case of emergency. The other anxiously watched a meter at a distant part of the transmitter frame, and with a long stick occasionally tapped the handle of a large voltage regulator. Notices—"Hoogspanning — Levensgevaarlijk" ("High voltage — danger")—hang everywhere,

and remind one of PCJ's 25 kilowatts.

The noise of the generators, of the water pumps and running water, and the buzzing of the mains transformers, added to the blare of the loud-speaker, is almost deafening, and the heat of the valves makes the room quite "summery."

Switching off is impressive. There are sixty switches, and the two men, on a pre-



View of the transmitter from the crystal end

arranged plan, do the whole job in about half a minute!

Then, while the generators "ticked over" and the water guggled away from the valve anodes, the chief engineer told me that the H.T. voltage on the anodes is 12,000, and with pride he pointed to a roughly written notice above the main oscillator panel: "Hiep, hiep, hoera! Eindhoven — Bandoeng, Maari 1927." This was in commemoration of the first time that the experimental transmitter, then situated at the Philips works at Eindhoven, had been received at great strength at Bandoeng (Dutch East Indies) in March, 1927.

Mr. Startz, who's voice you doubtless know so well (he does all the announcing) speaks English with a marked American twang, and is full of American "pep" in his interests for PCJ; he is the real personality behind the station. And PCJ has received reports from North and South America, from San Francisco to Buenos Aires.

And as we came back through the fields, chatting to the Dutch officials of the station, I felt a patriotic pang in that England boasts no PCJ!

KENNETH ULLYET.



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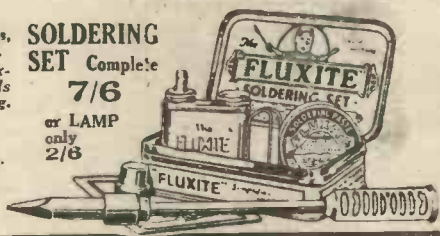
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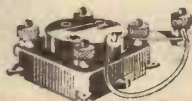
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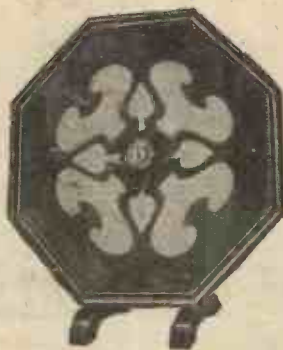
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# On Your Wavelength!

## Some Secret!

THE lay journals not infrequently provide the wireless devotee with a certain amount of amusement when they let themselves go on his pet subject. The other day one of them came out with a splash announcement that Brookmans Park was about to conduct secret tests with transmitter number two. Secret! Ye gods! You can't keep a transmission very secret when you are pushing it out for all the world to hear with 30 kilowatts behind it. What was meant, I suppose, was that B.P. will soon be testing outside broadcasting hours on a second wavelength of 261 metres. I believe that one or two tests have already been made, though I have never picked one up so far. The snag which is most feared as regards B.P. Number 2 is fading, which is usually rather pronounced on wavelengths below 300 metres. A fading area will quite likely occur outside a radius of about fifty miles from the station. How wide this area will be no man can tell until experiments have been made, but beyond these limits excellent signal strength is likely. It is quite possible that the shorter-wave station will be better heard than the longer at Land's End and John o' Groats.

## Fading Mysteries

This autumn, though signal strength all round has been remarkably good, has been a particularly bad one for fading so far as Continental transmissions are concerned. All sorts of explanations have been given to show why fading occurs, though none of them seems to be completely satisfactory, for none makes clear why it is that we have epidemics of fading just as we do of measles and 'flu. Everyone knows that distant transmissions within the limits of the medium band are liable to wobble badly in the between seasons, when summer is giving way to autumn and spring to summer. But no one seems to be able to tell us why it is, for example, that fading should be more noticeable in October and November, 1929, than in the same months of 1928. Nor, again, can we say with certainty why certain stations should show sometimes rather rapid fading and at others long, slow, periodic swings from a terrific maximum signal strength to a minimum that may be near inaudibility.

## The Three Greatest Problems

The three biggest problems confronting the research worker in wireless at the present time are how to eliminate atmospherics, how to suppress the effects of fading, and how to cram into a particular band more than twice as many broadcast-

ing stations than there is really room for. So far, no means of eliminating atmospherics has been discovered, though scores of patents have been taken out for systems which claimed to do so. Fading has been rather more successfully tackled. On the short waves much can be done by having twin receiving stations some considerable distance apart. It has been found that a signal may be at a maximum in one place whilst it is at a minimum in another. Or two transmitters can be used sending out simultaneously on different wavelengths. At the receiving station arrangements are made for blending the two transmissions into a common output. This does away to a very great extent with fading, but it has the drawback of bringing in a double ration of atmospherics.

## Quart and Pint Pot

What we do really need is some system of telephony which will enable stations to transmit without requiring channels 9 kilocycles or more in width—or, alternatively, a system of reception in which a very high order of selectivity can be employed without detriment to quality. I may be wrong, but my own belief is that before we are so very much older we shall see a revolution in methods of reception, for, though it is heresy to say so, I am not at all sure that in certain principles of tuning we have not all been barking up the wrong tree ever since the wireless transmission of telephony began.

## Novel Turns

Quite the most surprising item that I have ever seen announced from a broadcasting station is one that the American WLW is putting on. This consists in a roller-skating exhibition of Roly and Poly (!), who claim to be marvels in that line. And it is going to be done, mark you, by means of the microphone and without any help from television. The B.B.C. was pretty good the other day, when it gave us a lady who whistles in her throat. Don't be surprised if one of these days you see billed for 2LO, "Thermion, the man who sings in his bath." Anyhow, we have already had many exponents of the art of talking through one's hat.

## S.G. in U.S.A.

Though the first screen-grid valve was brought out, if I remember aright, as a laboratory curiosity in America, people in the United States fought shy of this form of tube for a very long while. It was, in fact, very widely adopted by wireless enthusiasts over here before the majority of their counterparts in America had ever heard of it. There are signs now that on

the other side of the Herring Pond they are awakening to its possibilities. Many of the newest sets incorporate it, with remarkably successful results. From what I have seen of them, American S.G. tubes are not nearly so good all round as our screened valves. We seem to hold the secret of producing uniform valves that will retain their original working characteristics over very long periods. What I find about most foreign valves is that no two of the same type are quite alike and that huge differences are to be found between the curves of a valve when new and those taken when it has seen perhaps a couple of months' service. This point is enormously important with S.G. valves, and even more so with pentodes, for if the valve's characteristics alter when used, and if you can't be sure that a replacement valve is precisely similar to the original, a variety of queer effects may be observed in the modern receiving set with its highly efficient circuits.

## Halle Concert Reception

When listening to a recent Hallé concert I was impressed by two things. The first of these was that the bass seemed to come over quite well, considering the length of land-line over which the transmission had to be carried before it reached the transmitter. Usually the loss of bass on a transmission line is quite noticeable. One has only to compare the same item being broadcast from London or Daventry to appreciate the relatively smaller amount of bass from the latter station.

In this particular instance, however, the bass seemed to be in quite good prominence, although not so well as I have sometimes heard it from, say, the Queen's Hall, London. The other point, however, was that the microphone seemed to be badly placed. The *pianissimos* were so intensely soft that one had to strain considerably to listen to them, while if the volume was increased so that the *pianissimos* were comfortably audible, then the climaxes were too loud for pleasantness.

Hamilton Harty, of course, is a conductor who believes in a considerable amount of light and shade. In fact, I rather feel that he is inclined to overdo the contrasts in the music; but, even so, and making all due allowance, it seemed to me that the results were much too extreme. One had the impression, even when the fiddles were playing good and hard, that they were not being received so well as they might, and this led me to the conclusion that the microphone was not placed as well as it might have been.

Personally, I have never attended a Hallé concert, and so I do not know



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## On Your Wavelength! (continued)

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whether the microphone is suspended in a visible position, as it is in London at Queen's Hall; but, in any case, it would be interesting to know whether the effects which were noticed were due to this cause or whether some other explanation must be found.

### Land-lines and Quality

Talking about land-lines, by the way, I see that the Post Office are making special provision for broadcasting in the new land-lines which they are putting up. Hitherto it has not been necessary to cover a very wide band of frequency, something from 200 to between 2,000 and 3,000 being adequate for speech purposes. Indeed, on actual speech, it is possible to cut off a very considerable chunk of the frequency spectrum without losing any intelligibility to speak of. The mean speech frequency is approximately 800 cycles per second, and if one cuts off all the frequencies above this it is nevertheless possible to understand what is being said, although one would not say that the intelligibility was good.

If, on the other hand, one cuts off all the frequencies above 1,700, then the intelligibility remains quite good, provided that the lower frequencies are well reproduced and vice versa. Therefore, the design of a cable to transmit good speech is fairly simple compared with the broadcast problem where one endeavours to reproduce all the frequencies between 50 and 5,000. The present land-lines, of course, will not do anything of the sort, and although they have, in many cases, been improved to cope with the increased demands of broadcasting, they were not originally designed for the purpose and cannot satisfactorily meet the requirements.

### Improved Results

The new lines which the Post Office are putting down, particularly the longer ones, are being made specially suitable for broadcasting and will cover a very wide frequency range indeed. It is probable, therefore, that in the future provincial listeners will be able to enjoy the same quality from their local station as is at present the good fortune of the Londoner. Few Londoners realise how much they are to be envied in the excellent quality which is broadcast from their own station as compared with the distinctly mutilated version of the same thing which is of necessity broadcast from provincial stations.

### A New Television System?

The other day I saw it announced that a new system in television had been invented; so I went out of my way to get all the details possible, for news of this character, if it were true, seemed too good to miss. It was claimed that only about half the usual waveband formerly believed necessary for good radio picture transmis-

sion and reception was required. However, I must confess that my investigation proved disappointing, for at the outset, when introducing the invention, it was stated that a 100-kilocycle frequency channel had been used to transmit clear images. Garner and Sanabria, of America, were responsible for this remark, and in view of the rather glowing reports of the television efforts of these two engineers, the mystery would appear to be explained if they were accommodated with an "ether band" sufficient to supply the needs of at least ten broadcasting stations.

### Nine Kilocycles Sufficient

While it is admitted that all the detail desired cannot be transmitted adequately with a 9-kilocycle waveband, to go to the other extreme and say that 100 kilocycles is necessary would rule out the commercial possibilities of television at once. With the test television transmissions now being sent out both by 2LO in England and Witzleben in Germany (this last station, by the way, being regularly on the air from 9.30 to 10 each morning and 1 to 1.30 each afternoon with tele-cinema), the 9 kilocycles is adhered to. The detail is not quite so good as by land-line alone; but, even so, there is a wealth of detail which surely does not need ten times as much room in the ether to improve. With twice the normal sideband allocation there would be practically no fault to find, according to measured tests which I know have been made.

### A Multiple-spiral Disc

To revert to the system which these two engineers have called new, I find that they base their claims on a multiple spiral aperture disc. They use 45-line elements per picture and 15 pictures per second are transmitted. Several partial pictures are interposed at the receiving end, and the eye is said to be capable of retaining and combining these rapidly recurring partial frames into a smooth picture with no noticeable flicker. It is also stated that the "mixing" of the electrical impulses reduces greatly the interference between stations, but this is rather difficult to comprehend at the moment. In any case, well over a year ago, Baird in this country publicly demonstrated a multiple disc.

### A Regional Point

An article which appeared a week or two ago in AMATEUR WIRELESS suggesting that the regional scheme could not work in its present form has produced a good deal of correspondence. Many of the letters came from those who live in places far from Brookmans Park and accuse the writer of selfishness, since they now hear the London programmes to perfection. It seems to me that these correspondents are rather missing the whole point of the

article, which was briefly this. A very large district to the north of London is now swamped by Brookmans Park, scores of receiving sets having become virtually obsolete. Matters will be infinitely worse in this district when the second transmission from the same place comes into operation. Those living in other parts of the country must remember that their turn will come as more and more stations are built. What, for instance, of the densely populated West Riding of Yorkshire when Moorside Edge lifts up his voice? And what of the whole country when we have ten high-power transmissions all going at the same time? One has always to take a long view in these matters. We who live within the very extensive wipe-out area of Brookmans Park know what others are going to suffer if the scheme ever goes through on its present basis.

### Which Are You?

I was rather surprised the other day to learn that by far the greatest number of the valves in use in this country at the present time are of the two-volt variety. The reason, I suppose, is that a two-volt accumulator costs less initially than a "four" or a "six" and weighs a good deal less when you have to lug it round to the charging station. Personally, I began as a four-volter in the days when all valves had four-volt filaments. But as soon as the six-volt dull-emitter was developed I became a six-volter, and have remained one ever since.

There is no gainsaying the fact that the two-volt valve of to-day is a first-rate component, being probably much more efficient all round than its six-volt counterpart of a few years ago. Still, it seems to me that six-volt valves are just a little better; sufficiently so, in fact, to make their use well worth while for the man who likes to get the last ounce of efficiency and quality from his set. And really the accumulator question, when one comes to work it out, is almost as broad as it is long. Here is what I mean. Suppose that you are using a three-valve set with a high-frequency stage, a detector, and a note-magnifier. Then with two-volt valves your H.F. and detector will each take .1 ampere, but the output valve—if it is, as it should be, of the super-power class—will probably require about .4 ampere. Thus we have for the whole set a total filament consumption of about .6 ampere. With six-volt valves we can manage with .075 ampere apiece for the first two and .25 ampere for the output valve. This gives a total of .4 ampere for the combination. In other words, with six-volt valves we obtain a hundred working hours from a 40-A.H. accumulator, whilst a 60-A.H. is needed to give the same result with two-volt valves.

THERMION.



# YOUR AERIAL & SELECTIVITY

## HOW TO PREVENT "SWAMPING."

*One of the recommendations of the B.B.C. to listeners who are troubled with interference from Brookmans Park is that the aerial system should be shortened. To many people this appears tantamount to an admission by the B.B.C. that Brookmans Park is a failure. This is not so, however, as the following article by our Technical Editor will make quite clear.*

A FRIEND of mine the other day was explaining the difficulty he had in getting rid of the Brookmans Park transmission. He was situated only a few miles away and no ordinary wave trap was satisfactory. He had, indeed, to use a specially-constructed wave trap in order to receive 5GB free from interference, and he seemed quite despondent of ever receiving anything other than these two stations while Brookmans Park was transmitting.

"But," I remarked, "all you have to do is to reduce the length of your aerial system." This suggestion caused him considerable mirth. He said that it was really the best joke he had heard for a long time. When I asked him what the joke was, he said, "Well, it is rather like telling a plumber that you require a new washer on your tap and being told that the best remedy is to cut the water off at the main!"

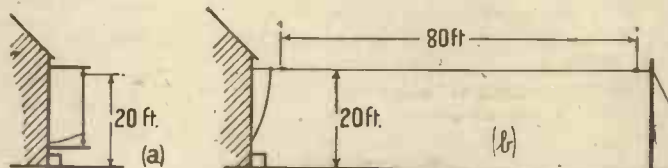
In view of the difficulty I had in convincing him that this was quite an erroneous view, the following article may be of interest.

### Aerial Theory

The theoretical aerial system consists of two plates. One of these can be replaced by the earth, while the other is suspended at some distance above the ground. In this theoretical system we have a capacity between this elevated plate and the ground, and we connect the two together through our tuning coil to form the standard oscillatory circuit, consisting of an inductance and a capacity in series. We assume that there is no capacity between the con-

necting wire and the earth, so that all the capacity is concentrated in the two plates.

Unfortunately, this ideal arrangement cannot be realised in practice. In the first place, it is not convenient to erect a large metal plate at some distance above the ground, and so we bend the wire over to form a horizontal top. This increases the capacity to earth of the upper portion of the aerial, and so imitates a large plate to some extent. Secondly, the wire itself has a certain amount of inductance and capacity distributed throughout its length,



The first aerial is twice as good as the second so that we cannot assume the capacity all concentrated at the top of the aerial.

Any length of wire, indeed, possesses what is known as a natural wavelength, this being the wavelength to which the self inductance of the wire is tuned by the self capacity. Any attempt to increase the height of an aerial is sooner or later limited by the increase in the natural wavelength, which becomes too great for convenience.

### Efficiency

An aerial receives most efficiently at its natural wavelength—which, by the way, is between four and five times the actual length of wire in a simple aerial. Consequently the nearer we make the natural wavelength of the aerial to the wavelength of the station being received, the stronger will the signals become. At the same time it will be clear that if the aerial is receiving on its natural wavelength, no additional inductance or capacity is required, and if we wish to tune the system to any other wavelength, the amount of inductance or capacity necessary will be small compared with the aerial constants themselves.

In other words, the aerial will exercise a dominating control on the tuning and the selectivity will be very poor. As we reduce the length of the aerial we reduce the natural wavelength and so remove it farther and farther away from the wavelength being received. Under such conditions the aerial has less and less effect on the tuning, which is ultimately controlled entirely by the tuning circuit proper.

In practice, therefore, we compromise, usually arranging matters so that the wavelength which we have to receive is around three or four times the natural wavelength of the aerial itself. The standard P.M.G. aerial is, 100 ft. long, i.e., almost exactly 30 metres. Consequently, the natural wavelength of such an aerial will be between 120 and 150 metres. Hence the middle of the broadcast band, which is usually taken as 400 metres, is approximately three times the natural wavelength of the aerial, and it is for this reason that the length of 100 ft. was originally determined.

For all ordinary purposes, this class of aerial is satisfactory, but where we are dealing with special conditions, such as those of Brookmans Park, then we find that working at a point three or four times the natural wavelength of the aerial is not satisfactory and it is not possible to obtain adequate selectivity. We must reduce the natural wavelength of the aerial so that our tuning becomes sharper, as we have already seen. Most people, however, are afraid of losing the efficiency of reception on distant stations, so that although they may get rid of Brookmans Park, they will have nothing left to receive.

This is not the case. Particularly with the modern screen-grid valve set, but even with a simple detector it is possible to receive a surprising number of stations with a very short aerial system. It does not follow that an indoor aerial is necessarily good, because there are all sorts of metallic bodies in the building which are liable to



**"YOUR AERIAL AND SELECTIVITY"** (Continued)

screen one's reception, but a short outdoor aerial is capable of giving results almost indistinguishable from the point of view of strength, and distinctly better from the point of view of selectivity than the standard P.M.G. arrangement.

An effect which is not generally known and which is of no little interest in this connection, is that the horizontal top portion usually provided in an aerial system is definitely harmful. The signals picked up on the top portion are *not* in phase with

the signals picked up on the down lead, and this effect greatly offsets the increase in efficiency due to the greater natural wavelength of the aerial. This is a point which cannot be explained in a few words, but the fact remains that the single vertical wire is twice as good from the point of view of reception as an aerial of the same height with a horizontal portion four times the height. These two aerials are illustrated in the diagram, and it will be seen that the second aerial is quite a common form, yet

it is only half as good as the simple single wire.

As a matter of fact, it is possible to obtain an intermediate state of affairs with a somewhat reduced aerial having a small horizontal portion, and I hope to go into this in a future article, but the remarks which have been made will serve to indicate that the reduction in the total length of aerial wire employed is not by any means the retrograde step that it appears at first sight.

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*A New Three-valver of Wonderful Performance.*



# WITHOUT FEAR OR FAVOUR



*A Weekly Programme Criticism by Sydney A. Moseley*

THE birthday affair was quite good fun. Listeners must remember that the programme was provided almost wholly by members of the editorial and other staffs—all amateurs who preferred to offer more or less informal fun and a pukka show. They all did well, including "sounds off"—not to mention the squawking quintet.

Let us have more of these informal items, with perhaps a little more rehearsing.

If the B.B.C. had taken its listeners into its confidence *before* patching up the matter in regard to the song title scandal, I am perfectly certain that not one listener in a thousand would have helped the profiteers by calling upon the B.B.C. to arrange the matter in the present unsatisfactory manner. One thing the B.B.C. must set its face against: the machinations of the commercial mongers outside.

The news that Sir Walford Davies proposes to disappear for a while will disappoint many listeners, but I am not certain that he is not wise in his generation. To rest a while on the height of his popularity is a good strategic movement.

It was a pity that the "conversation" between Mr. J. L. Garvin and Count Harry Kessler on "England and Germany" had to be postponed. But Dr. Grenfell's appearance was both in the nature of a surprise and pleasure. It was a pity, though, that he had to speak extemporarily because even the most lucid speakers cannot do as well before a microphone as those who know beforehand what they are going to say. He did exceptionally well, and what was amusing was his youthful voice. Had I not known that the author of one of my cherished books was talking I should have thought it was a 'Varsity undergraduate!

I looked forward to *The Beggar's Opera*, but this was spoilt by the interruption of the announcer after each small song. Why on earth was it necessary to break the thing up by this stupid reading out of the titles? People do not interrupt operas by saying what the title of the next song is. The result was that, instead of a continuous half an hour of this beautiful opera, one

had snippets. I feel so angry about this that I had better not write any more. It spoilt what was to be an excellent half an hour's miniature opera.

One of the beauties of wireless is, or used to be, the possibility of listening to music without the senses being assailed by raucous applause, but the B.B.C. seem to be doing their best by the studio claque to render this advantage nil.

Those outside dinners, too, composed usually of people who have dined well, and I hope wisely, resolve themselves into transmissions of ear-splitting noise.

It is a great pity, particularly as the concert provided by the Manchester Unity of Oddfellows was quite well arranged.

If Alec McGill had ceased from interrupting, we might have enjoyed Gwen Vaughan's singing. Why he butted in on her songs baffled me, and they called themselves "The Cheerful Chatterers." Cheerful, what?

I don't seem to remember Marriott Edgar, but he did quite well in his song of the char-a-banc guide. No doubt we shall be hearing some more of Edgar.

By the way, I don't think Mr. Basil

Mayne need worry about the few malcontents' letters. He will always find these people, and they are entitled to be heard, but there is no reason why he should just select them and advertise their letters.

The vaudeville programmes (I hasten to touch wood!) seem to have been better lately. For instance, one in which Harry Hemsley, Clara Evelyn and Gordon Clether, Ronald Frankau, and Mabel Constanduros took part was one of the best I have heard lately.

Curious thing, but Gordon Clether sounded like a voice from the past. Last time I heard him was in the gunroom of our depot ship at the Grand Fleet Base. He then sang "The Devout Lover," and it was the only piece of sentiment I heard in that ship for months.

Why do Ronald Frankau and Leonard Henry remind me so much of each other? They are both clever young men.

I still submit that some of the plays that are put over would be equally strong and realistic if a few of what are called "daring expressions" were omitted.

At the Listeners' Club:—

The Sportsman: "I seem to miss many of the running commentaries on various sporting events, but I happened to listen to one of them recently, and it proved so different that I must comment on it. The item was a football match, and as an old footballer I found this trying. The commentator's words took the form of a technical discourse rather than a first-hand account of how the match was progressing. A general summing-up of the play *after* the match from an expert would be acceptable, but to have to listen to his opinions while endeavouring to follow the ball isn't right."

Jazz Lover: "More interference with the late night dance broadcasts! Jack Payne's Band was due to play at 10.30. They started—through bad programme-timing—at 10.45. They played one number and then followed a surprise talk by Santos Casani on a new-fangled dance step. Then followed a few more numbers, after which Miss Janet Joyce butted in. And so on. . . . I shall start going to bed early for a change."



Guy Cartoonist 'impression of Peter Bernard



Of late there has been a tendency to crowd together the parts of a set in order to make it compact, but I doubt very much whether the saving effected by shortening the panel and cabinet by 2 or 3 in. is a matter of any importance to most of us.

When it can be effected without introducing instability or lowering the magnification, then the extra care that must of necessity be given is repaid.

Performance and ease of wiring is what matters however, therefore "Everybody's 3" was not compressed in any way, but was so laid out that the correct results should be obtained by any builder following the drawings.

The photographs reproduced in last week's issue and those which accompany

might be used. Do not forget to allow room for the shielded valve to be inserted, however.

No doubt many readers have their own method of tackling a set of this description. Personally, I find the best plan is to build in steps. The first is obviously to obtain all the parts and drill the panel and terminal strips. Then those parts that have to be fitted to the panel should be dealt with, including the brackets. These, by the way, must be carefully fitted, as it is easy to split the panel by forcing the brackets when screwing them to the baseboard.

The third step should be to fit the parts to the baseboard, but before finally fixing them it is well to put panel and baseboard together to make certain that all parts clear.

I should examine all parts before fixing them, making sure that the terminals are satisfactory, that the grid leak fits its holder, and that the condensers are mechanically sound. The filament resistance, too, should be tried; it should have a nice free movement. The coils themselves are quite robust, but take care of the switch connections. Also, do not use great force when tightening the nuts. Be sure to use the right coils, as indicated in the illustrations and by the letters in the diagram. Another little point to watch is that the fixed condensers are not mixed. The grid condenser is of .0002 microfarad, while the two .0001-microfarad condensers are used in the aerial circuit, and between the anode of the detector and earth respectively.

### Wiring

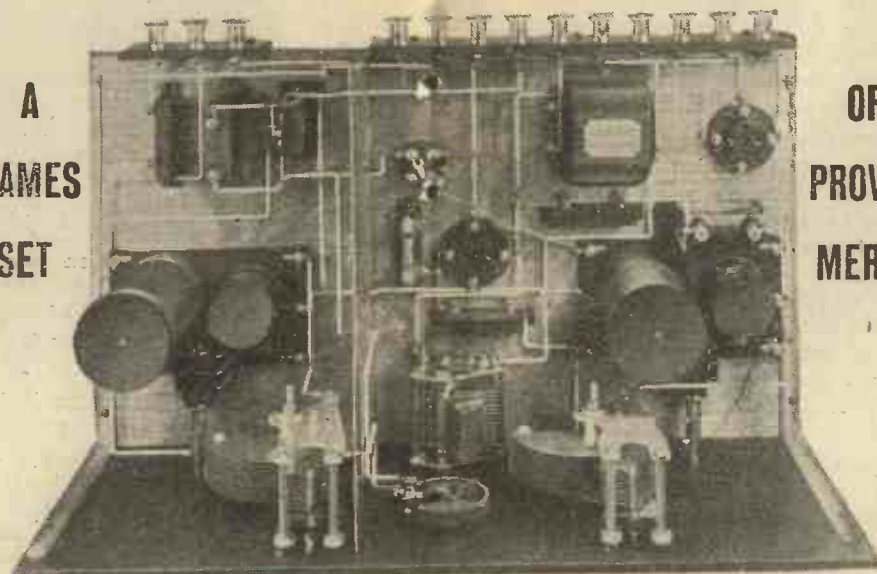
Certain of the wiring can be carried out with the panel removed from the baseboard. This is the fourth step, of course, and from my experience is the one most often hurried. Some people will consider a set to be practically completed when the parts are assembled. This is a mistake. A little time should be spent in nicely fitting the wires. There are not many of them, and you may as well fit them neatly

# EVERYBODY'S

Continued From Last Week's Issue

A  
JAMES  
SET

OF  
PROVED  
MERIT



### LIST OF COMPONENTS

The components required to build the receiver are as given in the accompanying list:—

Ebonite panel, 18 in. by 7 in., and two strips, one 10 in. by 2 in. and one 31 in. by 2 in. (Raymond, Becol, Trolitax).

Baseboard, 18 in. by 10 in. (Camco, Pickett, Clarion).

Two .0005-mfd. variable condensers (Igranic, Lissen, Jackson, Burton, Ormond, Polar).

.0003-mfd. reaction condenser (Cylodon Bébé, Formo).

15-ohm panel-mounting rheostat (Lissen, Igranic, Wearite, Bulgin).

Pair of 1930 Binowave dual-range coils complete with extension spindles (Wearite).

Screen-grid valve holder (Parex type L, W.B., Peto-Scott).

Two anti-microphonic valve holders (Lotus, Benjamin, W.B.).

this article show pretty clearly that the parts are neatly arranged and all wires easily reached. There is no crowding.

Liberties cannot be taken with a set providing the maximum of amplification, but anyone with a little experience could, if necessary, fit the parts a little closer together in order that a cabinet to hand

### A MINIMUM OF 20 STATIONS AT LOUD-SPEAKER STRENGTH

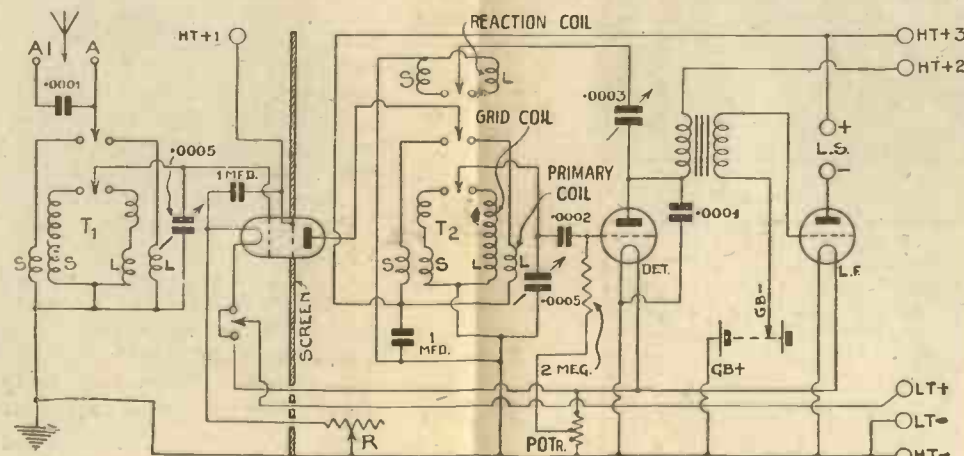
and correctly, preferably soldering them.

Finally, screw the panel and baseboard together and join the remaining parts. For wiring I prefer thin tinned copper wire, such as No. 22, with suitable systoflex. The thick sleeving is rather unsightly, as it can seldom be laid straight. Those who prefer a covered wire may use Glazite, taking care when uncovering the ends not to injure the wire. Also be careful of the wires running through the screen. This, by the way, is earthed, a neat method being to pass the wire below the head of a fixing

screw and a couple of washers. Alternatively, a soldering tag may be held by a screw and the wire taken to the tag. Actually three wires connect with the screen, one being from the coil base and the others from the earth terminal and negative L.T.

### Suitable Valves

The results obtained are dependent to a large extent upon using the right valves properly. In the first stage a shielded valve must be used. Most of those in the



The circuit of "Everybody's 3"



This "close-up" shows the arrangement of the L.F. end of the set



3

2-volt series have an impedance of about 200,000 ohms and an amplification factor of from 170 to 200.

These are the makers' figures, but tests show that the valves issued may be

expected to range from about 150,000 to 250,000 ohms, with correspondingly lower and higher amplification factors. Some valves may even be outside these limits, but they are still good valves. The important point to note is that the valve must have a good amplification factor for its impedance.

It will be clear, for example, that the actual magnification obtained will be only one half of the maximum if the valve used has an amplification factor of 100 and an impedance of 200,000 ohms, as compared with

200 and the same impedance. It does not matter so much when both values are above or below normal, as they may usually be corrected by adjustment of the screen voltage. It is interesting to note that the selectivity may be improved by using a valve of greater impedance, whilst the tuning is made less sharp by using a valve having a lesser impedance. Anyone having two or three valves can easily check these statements. Others, having only one shielded valve, will be able to note the effect of adjusting the screen voltage and filament current.

### The L.F. Stage

For the detector position a valve of medium detection may be used, or, say, a valve whose magnification factor is 20 or more. A valve of the R.C. class may be used, provided its impedance is not too high. This valve and the low-frequency transformer connected to it must be considered from the point of view of quality as well as the efficiency of detection. The quality is usually satisfactory when the transformer is a good one, having a ratio of about 3 to 1, and when the valve has a nominal impedance of, say, not more than 50,000 ohms.

A small power valve will generally

be the best for the last stage. Personally, I always use a super-power valve, because I have large batteries and a mains unit. But a super-power valve is of no great value to amateurs using dry batteries of the "standard" type. The batteries would discharge too quickly.

### First Tests

With the valves fitted, connect the filament accumulator and switch on. To do this turn the left-hand coil switch to the left or right.

Then join the grid battery, connecting the value of grid bias recommended by the makers of the power valve. Finally, join the screen voltage for the shielded valve to terminal H.T. +1 (usually from 60 to 90), the detector voltage to H.T. +2, and the

### LIST OF COMPONENTS (Continued)

...0002-mfd. fixed-condenser (Lissen, Dubilier, Graham-Farish, T.C.C., Watmel).

Two .0001-mfd. fixed condensers (Lissen, Dubilier, Graham-Farish, T.C.C., Watmel).

Two 1-mfd. fixed condensers (Lissen, T.C.C., Dubilier).

3-megohm grid leak (Dubilier, Graham-Farish, Lissen, Ediswan).

Grid-leak holder (Bulgin, Lissen).

Fixed potentiometer (Polar, Lewcos).

Low-frequency transformer (Cossor, Lissen, Varley).

Partition screen, 10 in. by 6 in. (Parex, Ready Radio, Peto-Scott).

Panel brackets (Bulgin).

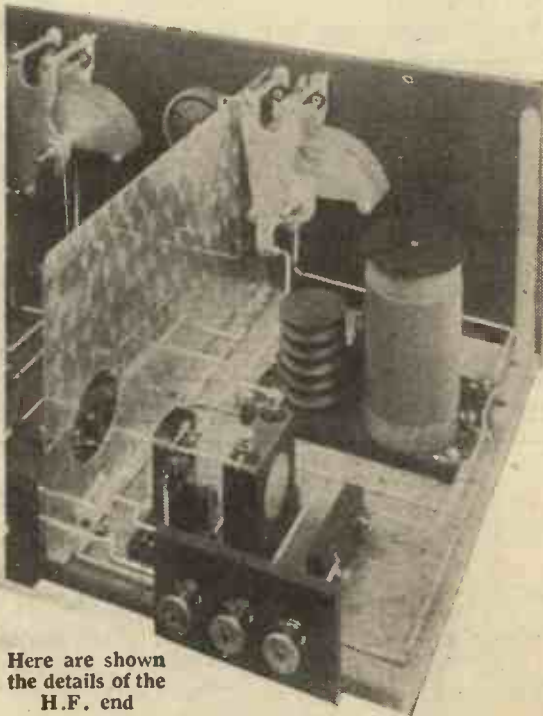
Thirteen terminals, marked: Aerial 1, Aerial 2, Earth, L.T.—, L.T.+, H.T.—, H.T.+1, H.T.+2, H.T.+3, G.B.—, G.B.+, L.S.—, L.S.+ (Ealex).

Connecting wire (Glazite).

Two dial indicators (Bulgin).

full voltage of the battery to H.T. +3 for the anodes of the power and shielded valves. About 90 volts will suit the detector, and 120 or more, if available, the anodes of the other valves. The selective aerial tapping is A1, and the volume will be less than when terminal A is used.

To receive medium-wave stations turn



Here are shown the details of the H.F. end



## “EVERYBODY’S 3” (Continued from preceding page)

both switches to the left. Turn the filament resistance full on, and set the reaction at, say, one-third in. When the local station is received, first turn back the reaction condenser, and then the filament resistance. This will reduce the strength.

If the resistance is turned well down, the effect of the reaction condenser can be tried and, if necessary, the H.T. to the detector can be adjusted to enable the right control of reaction to be obtained. Probably the best method of tuning is to turn up the filament resistance a little

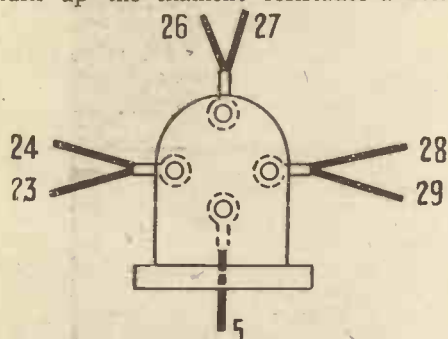


Diagram showing connections to screen-grid valve holder

and to cause the detector circuit to oscillate. Then, when a whistle is heard, the aerial tuning condenser can be adjusted to give the maximum strength.

The set is now exactly tuned to the station which will be received clearly by reducing the reaction a little, or by turning up the filament resistance. Many stations will be received with but little reaction, and even when the set is allowed to oscillate weakly, no interference will be caused,

as the oscillations do not reach the aerial circuit.

For the more distant stations the volume control resistance will have to be full on. A point to notice is that a distant station may be received with less than the full amount of reaction, according to the setting of the volume control.

### Condenser Settings of “EVERYBODY’S 3”

#### MEDIUM-WAVE STATIONS

Right-hand Dial	Station	Right-hand Dial	Station
Reading		Reading	
165	Budapest	105	Toulouse
159	Munich	95	London
153	Vienna	86	?
149	Brussels	84	?
146	Milan	80	Breslau?
140	5GB	76	Cardiff
138	Langenberg	72	?
134	Lyons?	60	?
126	Rome	57	Barcelona
120	Madrid	50	Glewitz?
116	Dublin	46	Belfast
114	Katowice?	38	Cologne?
110	Frankfurt		

#### LONG-WAVE STATIONS

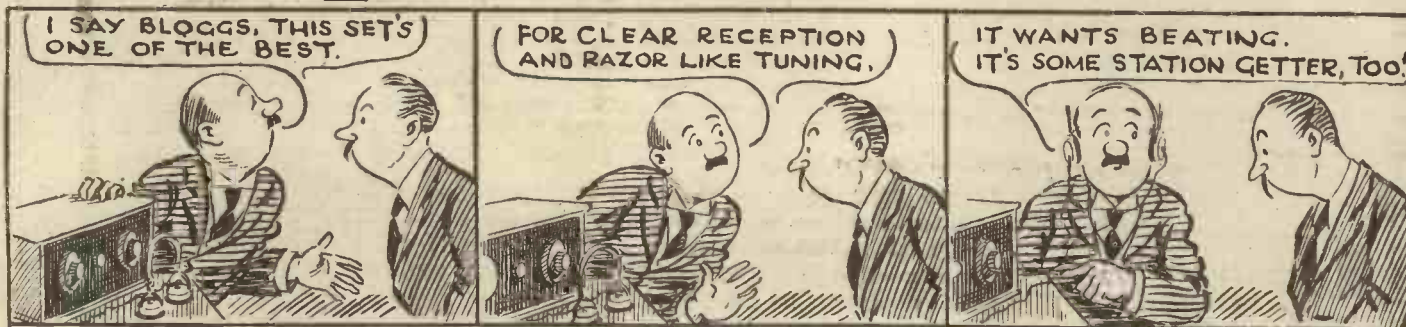
Right-hand Dial	Station	Right-hand Dial	Station
Reading		Reading	
155	Huizen	108	Eiffel Tower
140	Radio Paris	100	Motala
130	Zeeson	80	Kalundborg
120	Dav. 5XX	70	Hilversum

When interference is experienced, the volume control should be turned back a little. This increases the sharpness of tuning, for the reason that the impedance of the shielded valve is raised. It is best to find the most suitable value of screen voltage whilst tuned to a distant station. Thus, the voltage may be adjusted and the tuning tried again in order to obtain the best results. I do not suggest that the screen voltage be regularly adjusted; after the best value has been found for the particular valve used it should be left. The voltage is not a critical one.

The procedure when tuning long-wave stations is the same as when tuning medium-wave ones, but it will be found that the Continental broadcasting stations are very easy to receive. Good use must be made of the volume control. You should remember that it affects selectivity as well as the amplification. Therefore, reduce the amplification a little when interference is present and restore the strength by increasing reaction.

Most stations are received by adjustment of the two main controls, but the volume must usually be adjusted to avoid overloading the last valve. In a further article I will give tuning curves and explain how the aerial circuit should be adjusted for the best results according to the size and position of the aerial. Meanwhile, those who would care to experiment may connect the aerial through a .0001-microfarad fixed condenser to the grid of the shielded valve. This connection is the better one when the aerial is short.

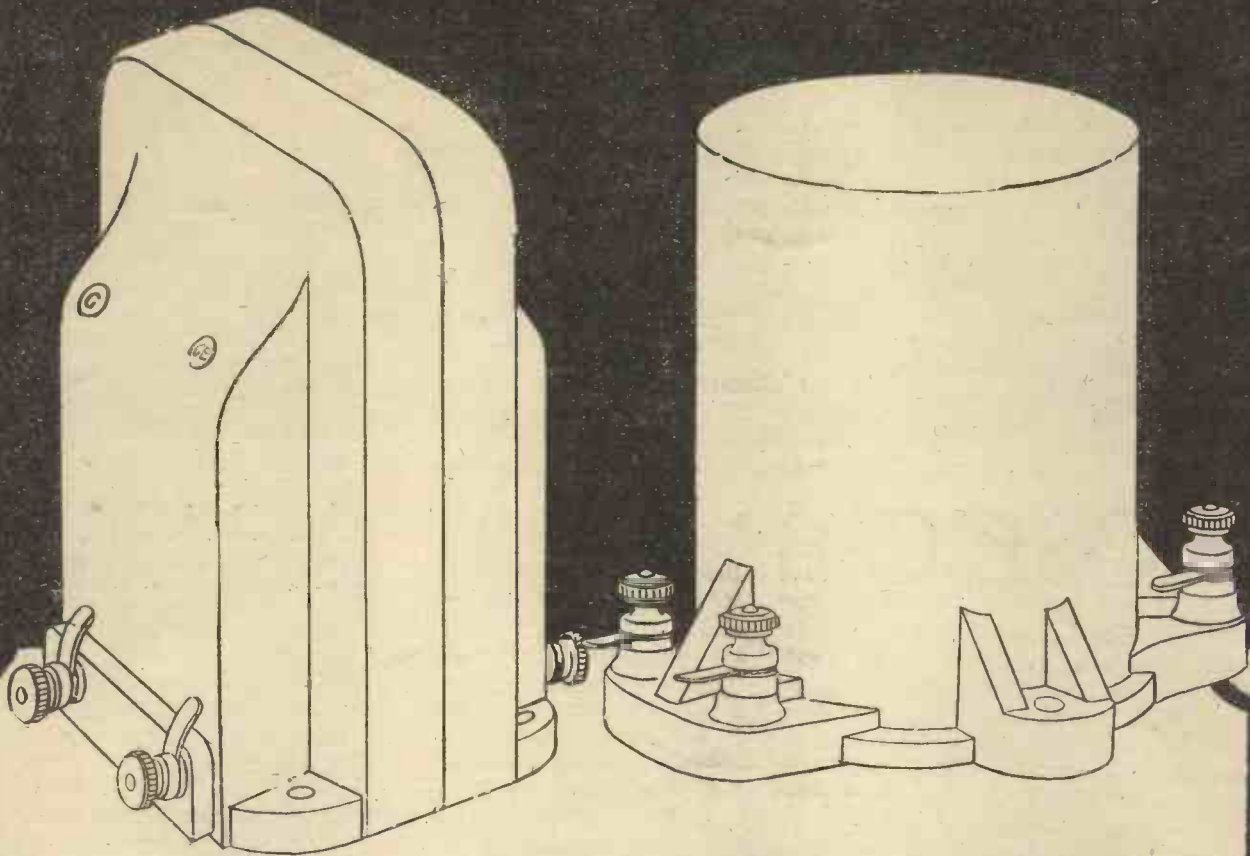
### MR. FLEX THOUGHT HE WAS A GLUTTON FOR STATIONS—



### BUT HIS FRIEND KNOCKS HIM INTO A COCKED HAT,







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A vivid impression of Wembley, before the start of the meeting when the broadcast was made

## THOSE O.B.'s! With Particular Reference to the Wembley Dirt Track Broadcast

THERE is one department of the B.B.C. which does not receive so many grouses as do other departments and that is the branch which is concerned with outside broadcasts!

No matter what may be said about the staleness or otherwise of the ordinary programmes, the Surprise Items—and in particular those for which the microphone has

short thrilling snapshot, as it were, ending with a climax of excitement. This particular broadcast is mentioned because it is typical of the many which the B.B.C. O.B. engineers have to tackle.

Just imagine if you were given a microphone and a telephone line through to Savoy Hill, and were told to give a "snappy" description of the racing and to let some 3,000,000 listeners, many of whom have never seen a dirt track, have a good idea of what thrills are worked up in motor cycle racing of this kind. Frankly it wouldn't be easy, would it?

As a matter of fact the B.B.C. engineers were testing at Wembley some six weeks before the actual broadcast. Surprising how much work goes on behind the scenes to result in only a half an hour's broadcast!

Wembley was chosen

because it was the most suitable track for the purpose, and not because there was any financial inducement! When the B.B.C. was tackled on the subject it made the point quite clear that there is never any publicity value attached to these broadcasts. In plain language the B.B.C. receives no £ s. d. for its O.B.'s! On the other hand the expense of testing, and of the installation of land-lines is heavy, and the cost of an O.B. is often very much greater than that of a good studio programme of the same length.

### Special Installations

Difficulties often have to be faced in connection with the installation of land-lines

and microphone leads. For instance, at Wembley care had to be taken owing to the large amount of metalwork in the buildings surrounding the track and also owing to the possibility of induction from neighbouring telephone and electric-light cables. To prevent any such troubles, lead-covered cables and conduits were used and really did prevent such interference.

A little sketch on this page shows the arrangement of the microphones on the occasion of this broadcast. The control box in which were situated two microphones is at the extreme end of the Press gallery right at the top of one of the grandstands, the idea being that the commentators could have a clear view of the whole proceedings. The B.B.C. always tries to place the commentator's "mikes" as high as possible, no matter whether it is a dirt-track meeting, a football match, or whatever it is. It is impossible to give a bird's-eye broadcast account unless one has a bird's-eye view.

Some O.B.'s are more than usually difficult because the event to be broadcast happens perhaps only once and a preliminary trial cannot be made. This was not the case, however, with the dirt-track broadcast, and on such occasions, some time previous to the actual event the engineers rig up what is known as a "closed circuit."

The "closed circuit" consists of an approximate arrangement of the microphones, a small amplifier, a volume control, and one or two pairs of 'phones. With this a test can be made to find the best microphone layout and in addition the correct positions for the volume and fade controls can be found. Usually this occupies some time and at Wembley, almost at the last minute, the position of one of the microphones was changed.

Actually the microphone which was used for picking up the noise of the dirt-track

(Continued on page 886)

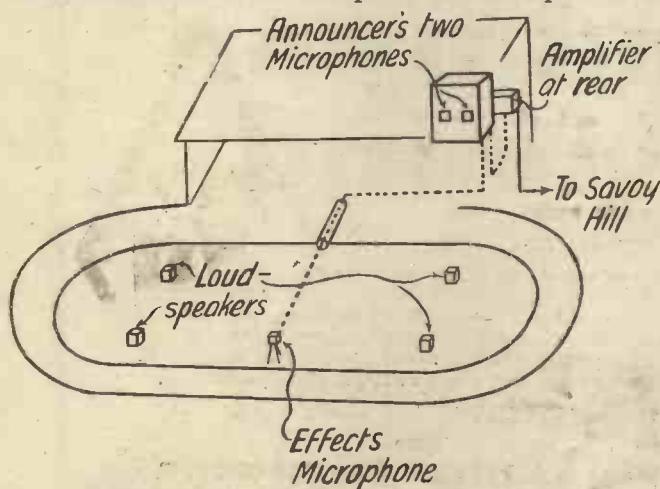


Diagram of track showing the "mike" and amplifier layout

to go out of doors—always have a wide appeal.

O.B.'s are divided into two classes; first, those which necessitate a relay of a complete item such as the Derby, the Boat Race or a football match of some kind; second, there are those O.B.'s which are included in the Surprise Items and generally speaking are only "impression" broadcasts.

For instance, one of these impression broadcasts was the recently-given running commentary of a speedway meeting at the Wembley dirt track. This was given during the ordinary course of the evening's programme and lasted not more than half an hour, all told. The idea was not to give an account of the whole meeting, but just a



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Voices in sharp relief; song clear and true; music full of life; that is what the **LISSEN Secret Process** does for your radio.

Because the current that flows from the large cells of this battery is produced by a new chemical combination and process which makes it pure, silent and sustained. There is never a sign of ripple in the current, never a trace of hum. It flows smoothly from beginning to end of the longest programme, and throughout months and months of use.

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60 volt (reads 65) ...	7/11
100 volt (reads 105) ...	12/11
120 volt ...	15/10
36 volt ...	4/6
60 volt (super power) ...	13/6
100 volt (super power) ...	22/-
9 volt Grid Bias ...	1/6
4½ volt Pocket Battery, 5d. each (4/6 doz.)	
Single Cell Torch Battery	4½d.

*You want pure power for your radio; any good wireless dealer will supply you with the **Lissen Battery** that will give it to you.*



**LISSEN LIMITED,** WORPLE ROAD, ISLEWORTH, Middlesex. Factories also at Richmond (Surrey) and Edmonton.  
(Managing Director: T. N. COLE)

Mention of "Amateur Wireless" to Advertisers will Ensure Prompt Attention



# My Wireless Den



Weekly Tips—Constructional and Theoretical—by W. JAMES

## Why the Condenser?

THE presence of a condenser in the anode circuit of a detector is usually of considerable benefit, particularly when the anode-bend method is used. This anode by-pass condenser actually improves the selectivity and signal strength.

If you have an anode rectifier you can soon prove this point. First remove the reaction condenser, if one is fitted, and also the by-pass condenser. Then connect between the anode and filament a fixed condenser of .0001 microfarad. An improvement in the signal strength and selectivity will be noticed. You must, of course, tune to a fairly weak station for these tests.

Then connect a larger condenser, such as one of .0002 microfarad, and again notice the improvement. Finally, try a .0005 microfarad. In all probability there will be no improvement in the results by increasing the capacity beyond .0003, but when the tuning coil is a good one .0003 is not too much.

In many sets a fixed .0001 mfd. condenser is used in addition to the reaction condenser.

## "Snags" in Ganging

Although the minimum of shielding is used in many three-valve sets having a stage of high-frequency, trouble is sometimes experienced when a two-gang tuning condenser is fitted.

This is because the two valves are not shielded—or, at all events, are not sufficiently well shielded. Hence, an amateur using one of the designs published in this paper as a basis, and fitting a two-gang tuning condenser, instead of two separate condensers, may expect trouble unless the two parts are properly shielded.

## Microphonic Valves

Microphonic valves are a thing of the past—at least, that is my experience. The valve makers seem to have discovered a means for preventing microphonic troubles, and we are therefore able to employ rigid valve holders.

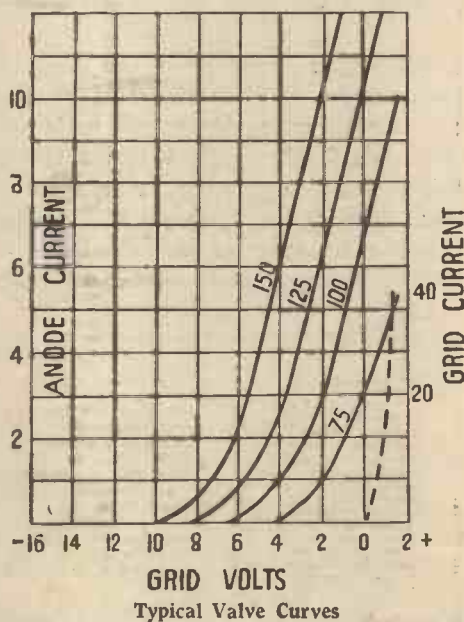
This surely is a relief, for many types of non-microphonic holder were troublesome. At the same time, howls may still be produced on occasions by interference or other effects. Thus the sound waves from the loud-speaker may strike the detector and

start a howl. Similarly, vibration may shake the valves and cause a noise or howl to be set up. It is, therefore, still necessary to exercise reasonable care, as even when a howl is not produced quality may be bad.

## Finding Amplification Factors

Do you know how to find the amplification factor of a valve from its characteristic curves? It is very easy.

A typical set of curves, taken from a valve instruction slip, is given below. They show how the anode current varies when the grid bias is changed for four values of anode voltage. The anode current is 6 milliamperes, for instance, when the grid bias is negative 4 volts and the anode



voltage is 150. It is also 6 milliamperes when the anode voltage is 125 and the grid-bias negative 2.2.

A change in the anode voltage of 25 is, therefore, balanced by a change in the grid bias of 1.8. From this it follows that the amplification factor of the valve is  $\frac{25}{1.8}$  or 14.

The amplification factor is dependent to an extent upon the values of high tension and grid bias used. Thus, if we take a current of 3 milliamperes, 75 volts high tension and zero grid bias, the magnification factor will be found to be 12.5, according to the curves.

## "Anchoring" Those Transformers

Certain transformers being provided with a terminal for earthing the case, one wonders whether it is worth while earthing the case of every transformer.

This is carried out easily enough by fixing a wire between one of the holding-down screws and the case—having cleaned the part, of course. Experience shows that earthing is quite unnecessary in the majority of instances where only the one low-frequency stage is used. But when two transformers are fitted it may be essential to earth them.

## "THOSE O.B.'s"

(Continued from page 884)

motor cycles was situated right away from the main grandstand, and quite near to the edge of the track. It was found that if the "mike" was placed on the edge of the track near the main grandstand the sloping roof reflected back most of the sounds and killed the crispness of the reproduction.

As it was, the rattling roar of the motor cycles came out like the tearing of linen, and by sound alone an enthusiast could detect one make of motor cycle from another as they passed round the track.

In the control box two microphones were placed in parallel in case of breakdown and also so that the two commentators could speak with comfort.

At the back of them was the fader control and an "A" amplifier, consisting of three R.C. stages. This amplifier passes the microphone currents on to further lead-covered G.P.O. telephone lines, and thence through a pot-head and the ordinary telephone lines to Savoy Hill.

Here is just one little "trick" which was resorted to. After some of the effects had been given and the commentators had explained the details of the racing, it was arranged that the effects microphone alone should be switched on and allowed to tell its own story of one complete race. And it was arranged that the effects "mike" should be turned so quickly that the deafening roar of the machines came as a sudden surprise to listeners. The broadcast really did work up to a climax of excitement.

And that is the secret of a successful O.B. K.U.



# Revolutionary New Lissen Pick-up

NEW NEEDLE ARMATURE FULLY FLOATING AND SO LIGHT THAT RESPONSE IS PERFECT AT ALL FREQUENCIES!



HOW THE NEEDLE IS SUSPENDED



Held in position by magnetic attraction without restriction by mechanical contacts.



"Better than 'Talking' Picture reproduction"—that is what everybody says who hears a gramophone record played by this new Lissen Pick-up. And actually the reproduction is better than the film experts have achieved—more natural, nearer to reality, because no longer are the high notes thinned out or the lower bass lost.

The Lissen Pick-up is so responsive that even the perfect electrical recordings of to-day can hardly do it justice. It responds to the most minute indentation on the record—the needle-armature is so light that the needle point actually feels its way along the record groove. And you'll find your records almost everlasting when you use this new Lissen Pick-up because the needle-point actually feels and does not plough its way along.

If you want every single record to sound much better than those you hear at demonstrations—if you want radio-gramophone reproduction that comes so near to reality that in a darkened room you would suspect the presence of the artist—get this new Lissen Pick-up and learn what perfection means. Any Lissen radio dealer will demonstrate it for you.

# LISSEN

NEEDLE ARMATURE  
PICK-UP 30/-



# LISSEN

4-POLE  
BALANCED  
ARMATURE UNIT  
(ADJUSTABLE)

The Lissen 4-Pole Balanced Armature Unit brings something approaching loud-speaker perfection within the reach of everybody who owns a radio set. You can build any type of cone loud-speaker with it; you can use it with a big baffle board, or put it in a cabinet. You can build a linen diaphragm loud-speaker with it, or you can buy it completely assembled and ready to connect up to your set. It has a fine adjustment, and you therefore get the utmost volume from it without chatter.

In brown moulded case with attachment for fitting to any type of cone. PRICE 12/6

Cast aluminium Chassis, specially designed to give the best results from the Unit. PRICE 7/6

13-in. cone for use with the above 2.6 COMPLETE ASSEMBLY OF LOUD SPEAKER UNIT, CHASSIS AND CONE. PRICE 22/6

# LISSEN

4 POLE BALANCED  
ARMATURE UNIT

Obtainable from all radio dealers; insist upon hearing Lissen before you buy.

UNIT ONLY  
12/6

COMPLETE ASSEMBLY  
22/6



# LISSEN

ELIMINATORS

The current you get from Lissen Batteries is the purest form of current you can get for radio. But if you want to use an eliminator, use a Lissen Eliminator. You'll then get current from your mains smoother, steadier, better than before.

There are four types of Lissen Eliminators; one of them will almost certainly be just right for your set. Tell your dealer what voltage your mains supply is and whether it is A.C. or D.C.; tell him what output you require, or what valves you are using, and he will demonstrate for you the Lissen Eliminator to suit your needs.

## TYPES AND PRICES

**D.C. Model "A."** Employs 3 H.T. + tapplings; H.T.+1 giving 80 volts for S.G. valves; H.T.+2 giving 60 volts at approx. 2 mA. for detector valves; H.T.+3 giving 120/150 volts at 12 mA. for power valves. PRICE 27/6

**D.C. Model "B."** Employs 3 H.T. + tapplings H.T.+1 and H.T.+2 are continuously variable (by means of two control knobs) and capable of giving any desired voltage up to 120/150 volts at approx. 2 mA.; H.T.+3 giving 120/150 volts at 12 mA. for power valves. PRICE 39/6

Models working on 100/110 Mains Voltage give output voltages of approximately 60 per cent. of above values

**A.C. Model "A"**  
Tapplings as in D.C. Model A.  
LN 576 for A.C. Mains voltage 200-210  
" 577 " " " 220-230  
" 578 " " " 240-250  
" 639 " " " 100-110  
PRICE £3 : 0 : 0

**A.C. Model "B."**  
Tapplings as in D.C. Model B.  
LN 579 for A.C. Mains voltage 200-210  
" 580 " " " 220-230  
" 581 " " " 240-250  
" 640 " " " 100-110  
PRICE £3 : 15 : 0

# LISSEN

ELIMINATORS

BUY LISSEN BATTERIES IF YOU WANT BATTERIES.  
BUY A LISSEN ELIMINATOR IF YOU WANT ELIMINATOR.

D.C. MODEL "A" 27/6  
A.C. MODEL "A" 60/-

LISSEN LIMITED, WORPLE ROAD, ISLEWORTH, MIDDLESEX.

(Managing Director: T. N. Cole.)

To Ensure Speedy Delivery, Mention "A.W." to Advertisers



## "A.W." TESTS OF APPARATUS

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

### Burton L.F. Transformer

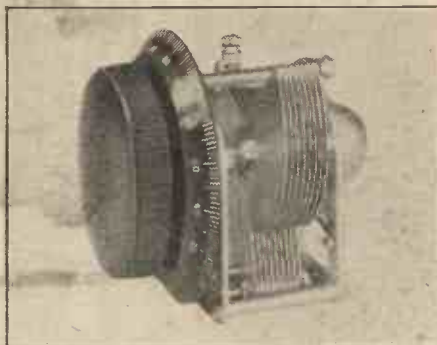
THERE is always a demand for inexpensive low-frequency transformers capable of giving a good performance under normal conditions. One does not expect such an instrument to have an exceptionally high primary inductance; and, indeed, this is hardly necessary with the majority of loud-speakers, since they do not reproduce the lowest frequencies.

The Burton intervalve transformer, manufactured by Messrs. C. F. and H. Burton, Progress Works, Bernard Street, Walsall, is a useful and efficient article of its kind which will operate effectively under average conditions. The windings are placed in two concentric formers, the primary on one side and the secondary on the other; the connections are taken to four terminals, two on each side of the moulded bakelite case, which completely encloses the windings and the core.

On test we took a number of readings of the primary inductance with various values of D.C. polarising current. With 2 milliamps flowing, the inductance was 17.7 henries, whilst with 4 milliamps it was 15.2. Even at 10 milliamps the inductance did not fall below 10 henries. These figures were all taken with a small A.C. current flowing through the windings to duplicate the conditions obtaining in actual practice.

This instrument should give quite satisfactory results when following a grid-leak

Rogers, Ltd., also market a .0003 variable condenser which in appearance is very similar to the standard .0005 article. This value of capacity is particularly suitable for a number of purposes, including reaction and short-wave work; in the latter case, .0005 microfarad is rather more than is



Polar .0003 microfarad Slow-motion Condenser

required to cover the necessary wave band and, in fact, becomes more critical to operate.

It is interesting to note that these condensers can be supplied with special phosphor bronze ball bearings for short-wave work. Steel balls in contact with brass give an unpleasant grating noise at short wavelengths, which is entirely obviated by the use of bronze balls. Indeed, these condensers give a very pleasant control on such wavelengths, owing to the smoothness of the slow-motion gear and the silence of operation, two qualities which we can vouch for from personal use.

The design and workmanship of these condensers are both excellent, and they can be thoroughly recommended.

### A Good Crystal

ALTHOUGH crystal reception in the London area has been affected by the new Brookmans Park station, in the districts outside London it has greatly improved, and many listeners living some distance away have had their first opportunity of good reception on a crystal set. It seems safe to predict that in many districts these simple receivers will become popular.

This week we have tested a Yep crystal, made by the Yep Manufacturing Co.; this is supplied complete with holding clip and cats-whisker for the modest price of 2s. 6d. The crystal is generous in size, and tests show that it is almost equally sensitive over its entire surface.

No better test could have been applied to this crystal other than trying it in the "B.B.C. Brookmans Park Crystal Set," published in AMATEUR WIRELESS No. 386,

November 2. At a distance of only six miles from Brookmans Park it was just possible to receive 5GB. The aerial coupling naturally had to be decreased as much as possible in order to perform this feat.

With the cats-whisker supplied, no difficulty was experienced in finding a sensitive spot, whilst the optimum pressure of the whisker on the crystal was not unduly light.

The "Yep" crystal can be recommended for its sensitivity and ease of adjustment.

### M.P.A. Cabinet Speaker

ONLY a few years ago loud-speakers were treated as scientific instruments, and in consequence the matter of appearance was hardly considered. In time, however, manufacturers and cabinet makers put their heads together and produced articles which in appearance harmonised with the normal furniture of a room.

The popularity and good reproducing qualities of the cone loud-speaker have undoubtedly aided cabinet makers in their task, for such a speaker can be readily mounted in an attractively shaped cabinet.

A cabinet loud-speaker received for test this week is made by the M.P.A. Wireless Co., of 62 Conduit Street, W.1. On seeing this speaker, one is immediately attracted by the finish and design of the cabinet with its dignified fret. The overall dimensions are 15½ by 7¼ by 15½ in. high, and it is



Burton Low-frequency Transformer

detector valve of medium impedance, whilst it will make an excellent second-stage transformer.

### Polar Condenser

POLAR components are well known to readers and in particular the brass vane condensers fitted with the standard slow-motion device.

In addition to the normal capacity of .0005 for the tuning condensers and .0001 for the reaction, Messrs. Wingrove and

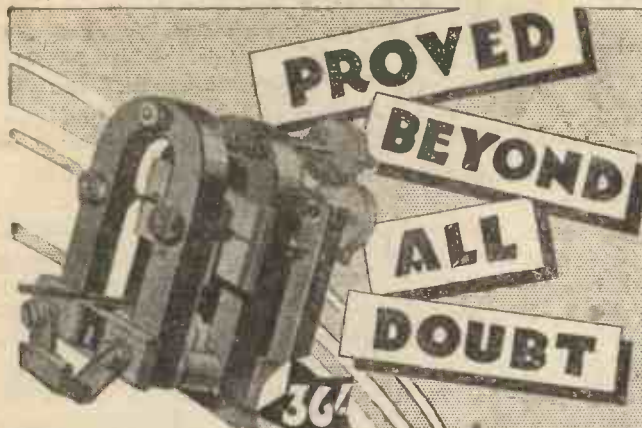


A Good Cabinet Loud-speaker—the M.P.A.

therefore possible to fit a large size cone. The operating unit is the standard type fitted successfully by the M.P.A. Wireless, Ltd., to many of their speakers, including the well-known plaque.

We were quite favourably impressed with this speaker when tested in our laboratories. The reproduction is pleasant without undue resonance, whilst the high notes have not been sacrificed for the sake of a booming tone. This instrument can be recommended.





## AMAZING LEAP TO WORLD-WIDE POPULARITY

Thousands a week have been sold to delighted listeners all over the country. The demand has risen to enormous proportions, and in response to constant requests, we are now supplying a specially designed Double-cone Chassis, for use with the Star Unit, or the complete speaker is available in pleasing cabinet form, as illustrated—so now every need is catered for. Everyone can enjoy the pleasure of the *Wates Star*: Experts, critics and listeners alike—acclaim it—the best reproducer yet, irrespective of price!

The *Wates Star* Duplex Unit, double magnets, eight poles, four coils ... 36/-  
Double-cone Chassis, with brackets 12/-

*Wates Star* Duplex complete Speaker with Double-cone Chassis in Oak Cabinet £4.0.0

Mahogany £4.6.0  
If unable to obtain locally can be supplied direct.

SHAFTESBURY RADIO CO.,  
(Dept. A.W.)  
184-188 SHAFTESBURY AV.,  
LONDON, W.2

**NOW  
UNIT.  
CHASSIS.  
CABINET.**

Your Set  
is only as  
good as its  
Speaker -

M.B.

**WATES  
STAR  
LOUD SPEAKER UNIT**

**THE STARS  
OF THE  
RADIO WORLD**

Introducing the  
*Double Cone  
Chassis & Cabinet*



## BLUE SPOT GOLIATH £6.6.0

The name "Blue Spot" represents all that is faithful and true in loud-speaker reproduction.

And the finest model of all is *Blue Spot Goliath*, *Blue Spot's* greatest speaker.

Ask your nearest dealer to demonstrate this speaker and you will hear the finest reproduction that to-day is possible.

Six guineas is the price of this superb instrument.



F. A. HUGHES & CO., LIMITED.

204-6 Great Portland Street, London, W.1.

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ONE of the most popular concerts of the season should be the one broadcast from the People's Palace, Mile End, on December 5. Sir Landon Ronald will conduct the orchestra, Solomon being the solo pianist.

John Watt, a member of the B.B.C. staff at Belfast, and George Barker, of the Harley and Barker vaudeville combination, have made of Dr. Arne's *Love in a Village* an up-to-date jazz opera. It is to be broadcast for the first time from 5GB on December 12 and from 2LO and 5XX on the following evening.

It is understood that the Wagner Festival which takes place annually at Bayreuth (Bavaria) will be relayed to British listeners next year. In the meantime the famous conductor, Franz von Hoesslin, who directs the orchestra at the Festspielhaus at Bayreuth, will conduct the B.B.C. symphony concert at Queen's Hall on December 6.

On Friday, December 13, listeners will

hear three contrasted quarrel scenes, the first two being portrayed by Shakespeare in *Richard III* and *The Taming of the Shrew*; the third is a short play by Edwin Lewis, entitled *Sea Silence*.

The Berlin Philharmonic, which ranks with the Philadelphia Symphony Orchestra as the finest in the world, will pay a visit to London on December 3, when its programme will be relayed from the Queen's Hall to 2LO and 5XX.

*The Golden Stream*, a pantomime first given at Belfast in 1882, has been prepared for the microphone from memory by the stage manager of the original production. The new version will be heard from the Belfast B.B.C. station on December 12.

The Cardiff station will relay from Bristol on December 12 *Smooth Crossing*, a new play in one act from the pen of Mr. Froom Taylor. It is to be presented by Bristol's Little Theatre Company.

The Champion Band of the "W" (Brixton Division) Metropolitan Police has

been invited to give a concert at the 2LO studio on December 7.

*Wilkins, or the Other Side of the House*, an original opera written by members of the Bermondsey Central School for Boys, is to be broadcast through 2LO and 5XX on December 14.

It is reported from Reykjavik that the new 15-kilowatt broadcasting station now in course of construction will be officially inaugurated in June, 1930, with a National Festival in celebration of the thousandth anniversary of the discovery of Iceland. The transmitter will work on 1,200 metres.

During the last few days, in its endeavour to find a comfortable position in the wave-band, Nice-Juan-les-Pins has worked on 237, 246, 250, and 256 metres. Although still advertising its programmes on 237 metres, the transmissions on most nights can be picked up on 244 metres.

The latest of the two Barcelona high-power broadcasters, namely, Radio Catalana (EAJ13), still remains in an experimental stage. In a series of nightly tests, on 268 metres, the call is put out in both Spanish and English.

According to a law passed in France in 1928, all owners of wireless receiving apparatus must register with the local postal authorities. The form to be filled in also bears a 3-franc stamp (6d.), the only tax the French radio fan is called upon to pay.

## HELLESEN DRY BATTERIES



### Verb. Sap.

RIDLEY told me at the Club last Monday that he had been consulted regarding the purchase of a Portable for a friend. There had been sixteen makes of set on his original list, but he had whittled the choice down to three when I saw him.

What interested me, though, was that of the original sixteen, every one was fitted as standard with Hellese's H.T. Batteries. "Naturally," he replied when I remarked on this fact, "It's the first thing I look for. If a manufacturer standardises Hellese's, the odds are that the other components he fits will be up to the same high quality. And anyway an H.T. Battery that has to fit a small space and yet supply four or five valves with juice for months on end needs to be a Hellese's and nothing less."

"Verb. Sap." I thought.

PRICES

Standard Capacity.

"Wiray" 9-volt Grid	2/-
Bias Type	2/-
"Wirin" 60-volt H.T.	10/6
Type	10/6
"Wirup" 99-volt H.T.	18/-
Type	18/-
"Wisol" 108-volt H.T.	20/-
Type	20/-
Treble Capacity.	
"Kotin" 60-volt H.T.	19/-
Type	19/-
"Kotup" 99-volt H.T.	32/6
Type	32/6

# HUNT'S

HELLESEN DRY BATTERIES,  
ELECTRICAL MEASURING INSTRUMENTS,  
POLYMET MICA AND PAPER CONDENSERS,  
HANDLAMPS, TORCHES, ETC.

A. H. HUNT, LTD., CROYDON, SURREY



35/- FOR 19/6

POST 9d.

For a limited time to introduce our P.R. Speaker we have arranged to supply the complete KIT to make up this wonderfully powerful speaker for 19/6.

The KIT consists of our Balanced Armature P.R. Speaker Unit, the Special P.R. Fabric Cone, 3-ply oak-front baffle.

4 heavy, natural oak, cabinet-finished sides cut ready for assembly, 4 pieces oak front moulding, 4 rubber feet.

3-ply unit cradle, screws, etc. The whole sent safely packed by return of post ready for you to assemble, with full instructions.

Please note that the above consists only of a complete KIT READY TO ASSEMBLE and is UNPOLISHED.

P.R. PRODUCTS,

Dept. 920, P.R. House, Newgate Street,  
Telephone: City 3788. London, E.C.4. Opposite Post Office Tube.

## DOUBLE THE VOLUME of your LOUD-SPEAKER

Fit a P.R. Moulded Paper Cone to your speaker and you will be positively amazed at the difference. Double the volume and much greater purity in tone. All the notes come out in their correct value. No resonance—no "drumming"—just pure and real music.

3/6

Post 4d.

THE PAPER  
WHICH HAS  
IMPROVED  
SPEAKERS ALL  
OVER THE  
WORLD

The P.R. Cone is the only one which correctly reproduces the human voice as well as instrumental music. That is why it will improve any cone speaker, no matter the make or price. 11 in. diameter, correctly proportioned, ready to fit, complete with washers and screws. Can be adjusted instantly. No cutting, sticking or wash leather required.

Sent C.O.D. if desired.

Telephone City 3788.

P.R. PRODUCTS, (Dept. C.2), P.R. House, Newgate Street, London, E.C.4. Opposite Post Office Tube.



# An Old Musician ~



appreciates music  
that he himself has  
played to thousands.

No greater testimony for Telsen Transformers could be found than the artistic sense of a Musician who writes to us of the wonderful balance of tone these Transformers give throughout the entire musical scale—which has now made it possible for him to hear as he once played to thousands.  
Try one in your set—and have music in all its reality!

**RADIO'S CHOICE AND  
A MUSICIAN'S, TOO**



**RADIOGRAND  
12/6**

Ratios 5-1 or 3-1

# TELSEN

## TRANSFORMERS

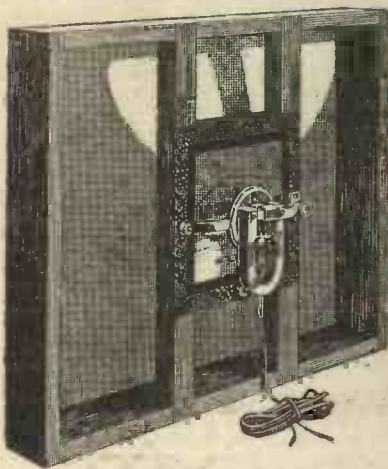
**TELSEN ELECTRIC CO., LTD., MILLER STREET, BIRMINGHAM.**

*Advertisers Appreciate Mention of "A.W." with Your Order*





The magic password to natural radio is the factory-made double linen diaphragm speaker



Chassis Type "F" £4-4-0.

There is something about a factory-made double linen diaphragm speaker which is the envy of all. It is beautifully finished, its diaphragms are wonderfully taut, they clearly demonstrate how the job might be done—if only the vast manufacturing resources of two continents could be brought to the amateur workshop bench. Do not envy the efficiency of the Ultra Air Chrome. It is not easily attained outside a modern factory equipped with every jot of research data and every manufacturing facility provided by the combined sciences of acoustics and electricity.

If you would hear with your own ears, then visit your radio or music dealer. He will convince you in the twinkling of an eye.

#### IN CHASSIS FORM

Type L	12" x 10" x 3"	42/-
Type K	14" x 14" x 5"	52/-
Type F	18" x 23" x 5"	84/-
Type J	24" x 24" x 6"	105/-

\*Suitable for the "Music Leader"

Stocked by every radio and music dealer from Land's End to John o' Groat's.

# ULTRA AIR CHROME

## SPEAKER

Patent No. 295,625.

Ultra Electric Limited, 661-663 Harrow Road, N.W.10

Baldry Ad. U510

# BROADCAST TELEPHONY

Broadcasting stations classified by country and in order of wavelengths. For the purpose of better comparison, the power indicated is *acrial energy*.

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>				<b>GERMANY</b>				<b>RUSSIA</b>			
25.53	11,751	Chelmsford (5SW) 15.0		288.5	1,040	Mont de Marson	0.3	*501	599	Milan (Milano)	7.0
*200	1,500	Leeds (2LS) ... 0.13		291.4	1,029.3	Radio Lyons	0.5	<b>YUGOSLAVIA</b>			
*242	1,238	Belfast (2BE) ... 1.0		*294	1,020	Limoges (PTT)	0.5	308	973	Zagreb (Agram)	0.7
*288.5	1,040	Newcastle (5NO) 1.0		304	986	Bordeaux (PTT)	1.0	429	695	Belgrade	2.5
288.5	1,040	Swansea (5SX) 0.13		309	970	Radio Vitus	1.0	570	527	Ljubljana	2.5
288.5	1,040	Stoke-on-Trent (6ST) 0.13		*316	950	Marseilles (PTT)	0.5	<b>LATVIA</b>			
288.5	1,040	Sheffield (6LF) 0.13		329	914	Grenoble (PTT)	0.5	*525	572	Riga	3.0
288.5	1,040	Plymouth (5PY) 0.13		331.4	905	Petit Parisien	0.5	<b>LITHUANIA</b>			
288.5	1,040	Liverpool (6LV) 0.13		364	824	Algiers	12.0	*1,935	155	Kovno	7.0
288.5	1,040	Hull (6KH) ... 0.13		368	815	Radio LL (Paris)	0.5	<b>NORWAY</b>			
288.5	1,040	Edinburgh (2EH) 0.35		411	729	Radio Maroc (Rabat)	2.0	240	1,250	Rjukan	0.18
288.5	1,040	Dundee (2DE) 0.13		447	671	Paris (Ecole Sup. PTT)	3.0	*283	1,058	Notodden	0.05
288.5	1,040	Bournemouth (6BM) 1.0		468	640	Lyons (PTT)	5.0	345	869	Frederikstad	0.7
288.5	1,040	Bradford (2LS) 0.13		1,444	207.5	Eiffel Tower	12.0	364	824	Bergen	1.0
*301	995	Aberdeen (2BD) 1.0		*1,725	174	Radio Paris	12.0	453	662	Tromsø	0.1
*310	968	Cardiff (5WA) ... 1.0		<b>GERMANY</b>				453	662	Aalesund	0.3
356	812	Brookman's Park 30		*218	1,373	Flensburg	0.5	*493	608	Porsgrund	0.7
*377	797	Manchester (2ZY) 1.0		*227	1,319	Cologne	4.0	<b>ROUMANIA</b>			
*399	753	Glasgow (5SC) 1.0		*234	1,283	Muenster	3.0	*313	959	Cracow	0.5
*479	626	Daventry (5GB) 25.0		*239	1,256	Nurnberg	2.0	*335	896	Posen	1.2
1,554	193	Daventry (5XX) 25.0		*246	1,220	Kiel	0.35	385	779	Wilno	0.5
<b>AUSTRIA</b>				*246	1,220	Cassel	0.25	*408	734	Kattowitz	10.0
*246	1,220	Linz	0.5	*253	1,184	Gleiwitz	2.0	*1,411	212.5	Warsaw	8.0
*283	1,058	Innsbruck	0.5	*259	1,157	Leipzig	1.5	<b>RUSSIA</b>			
*352	851	Graz	7.0	*270	1,112	Kaiserslautern	0.25	*427	702.5	Kharkov (NKO)	4.0
*453	666	Klagenfurt	0.5	*276	1,085	Koenigsberg	2.5	*483	621.5	Homel	1.2
*517	581	Vienna	15.0	*283	1,058	Magdeburg	0.5	*825	364	Moscow (PTT)	20.0
<b>CZECHO-SLOVAKIA</b>				*283	1,058	Berlin (E.)	0.5	938	320	Moscow	
*263	1,139	Morava-Ostrava	10.0	*319	941	Dresden	0.25	<b>SWEDEN</b>			
*279	1,076	Bratislava	12.5	*319	941	Bremen	0.35	281	1,301	Malmö	0.6
*293	1,022	Kosice	2.0	*325	923	Breslau	1.5	*257	1,160	Hoerby	10.0
*342	878	Brunn (Brno)	2.4	*380	833	Stuttgart	1.5	270	1,112	Trollhattan	0.45
*487	617	Prague (Praha)	5.0	*372	806	Hamburg	1.5	*322	932	Goeteborg	10.0
<b>BELGIUM</b>				*390	770	Frankfurt	1.5	*322	932	Falun	0.5
235.5	1,273.5	Charleroy (LL)	0.25	*418	716	Berlin	1.5	*436	639	Stockholm	1.5
240.1	1,218.8	Schaerbeek		*453	662	Danzig	0.25	*542	554	Sundsvall	0.6
244	1,229	Ghent	0.5	*456	657	Aachen	0.35	*770	389	Ostersund	0.6
270	1,112	Radio-Binche		*473	635	Langenberg	13.0	1,200	250	Boden	0.6
294	1,020	Liege	0.1	*533	563	Munich	1.5	*1,348	202.5	Motala	30.0
312	961.4	Arlon	0.25	*560	536	Hanover	0.35	<b>SWITZERLAND</b>			
339	887	Louvain	8.0	566	529.8	Augsburg	0.25	*403	743	Berne	1.0
*509	590	Brussels	1.0	575	521.7	Freiburg	0.35	*459	653	Zurich	0.63
<b>DENMARK</b>				*1,635	183.5	Zeesen	30.0	466	644	Zurich (during afternoon)	0.63
*281	1,067	Copenhagen (Kjbenhavn)	0.75	2,100	142	Norddeich	10.0	680	442	Lausanne	0.6
1,153	260	Kalundborg	7.5	2,290	131			700	395	Geneva	0.25
<b>ESTHONIA</b>				<b>GRAND DUCHY</b>				1,010	297	Basle	0.25
*297	1,010	Reval (Tallinn)	0.7	223	1,346	Luxembourg	3.0	<b>TURKEY</b>			
<b>FINLAND</b>				<b>HOLLAND</b>				*1,200	250	Stamboul	5.0
*221	1,355	Helsingfors	0.9	31.4	9,554	Eindhoven (PCJ)	25.0	<b>Education authorities in Scotland are beginning to include wireless as a subject in their evening classes syllabus. The Paisley authorities have already taken such a step, and in Glasgow classes of a similar nature for enthusiasts are held in the High School.</b>			
*1,795	167	Lahti	40.0	*208	1,004	Hilversum (until 5.40 p.m. G.M.T.)	6.5	<b>Radio Salamanca, a Spanish station which has not been heard for some time, has resumed its broadcasts on 456 metres.</b>			
<b>FRANCE</b>				*1,071	280	Hilversum (after 5.40 p.m. G.M.T.)	6.5	<b>The Tunis-Kasbah (North Africa) military station has resumed its radio-telephony broadcasts on 1,350 metres, a musical transmission is carried out daily at 8.15 p.m. G.M.T.</b>			
31.65	9,479	Radio Experimental (Paris)	1.0	*1,071	280	Scheveningen	5.0	<b>All wavelengths marked with an asterisk have been allotted according to the Plan de Prague.</b>			
175	1,714	S. Quentin	0.1	(from 10.30 a.m. to 5.40 p.m. B.S.T.)							
214	1,400	Fécamp (Radio Normandie)	0.5	*1,875	160	Huizen	6.5				
220	1,364	Beziers	0.1	550	545	Budapest	20.0				
238	1,260	Bordeaux (Radio Sud-Ouest)	1.0	<b>ICELAND</b>							
239	1,256	Radio Nimes	0.25	*1,200	250	Reykjavik	1.0				
244	1,229	Juan-les-Pins	0.3	<b>IRISH FREE STATE</b>							
*255	1,175	Toulouse (PTT)	1.5	*225	1,337	Cork (IFS)	1.0				
*265	1,130	Lille (PTT)	0.7	*413	725	Dublin (2RN)	1.0				
268	1,121	Strasbourg	0.3	<b>ITALY</b>							
*272	1,103	Rennes (PTT)	0.5	293	1,022	Turin (Torino)	7.0				
*286		Montpellier (PTT)	0.2	*330.3	908	Naples (Napoli)	1.5				
				*385	779	Genoa (IGE)	1.0				
				*441	680	Rome (Roma)	3.0				
				453	662	Bolzano (IBZ)	0.3				

## CHIEF EVENTS OF THE WEEK

### LONDON AND DAVENTRY (5XX)

- Dec. 4 *Deirdre of the Sorrows*, by J. M. Synge.  
 " 5 People's Palace concert.  
 " 6 Symphony concert relayed from Queen's Hall.

### DAVENTRY EXPERIMENTAL (5GB)

- Dec. 2 *Deirdre of the Sorrows*, by J. M. Synge.  
 " 7 Vaudeville programme.

### CARDIFF

- Dec. 7 Eye-witness account of the Welsh Trial Match at Pontypool.

### GLASGOW

- Dec. 7 Running commentary on Glasgow v. Edinburgh inter-city Rugby football match, by Mr. G. E. R. Young.



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**LIST OF LONDON AND SUBURBAN TRADERS:**  
**ABBEY WOOD.**—Abbey Wood Radio, 14 Harrow Manorway.  
**BARKING.**—H. J. Hills, 2-4 Axe Street.  
**BECONTREE.**—E. J. Blows, 295 Wood Lane.  
**BATTERSEA.**—P. C. Allen, 342, Battersea Park Road.  
**BOW.**—Eastern Wireless Co., 147 Roman Road; H. Harrison, 119 Roman Road; Louis Savaria, 19 Roman Road.  
**BRITTON.**—P. Stern, Atlantic Road; Marcelle, Stockwell Road.  
**CANNING TOWN.**—P. W. Radio, 47 Barking Road.  
**CITY.**—Perfecta Cycle & Radio Co., Ltd., 223 Shoreditch High Street.  
**CHADWELL HEATH.**—Cheffey & Fuller, Becontree Avenue.  
**CLAPTON.**—Clapton Radio, 32 Lower Clapton Road; Humphries, 8 Chatsworth Road.  
**CLAPHAM.**—H. D. Atkins & Co., 6 Clapham Road.  
**CROYDON.**—Busy Bee Radio, 14 Surrey Street; The Handy Shop, 11 Church Street.  
**CAMBERWELL.**—A. Wiseman & Co., 322 Watworth Road and branches; Camberwell Supply Stores, 183 Camberwell Road.  
**EAST HAM.**—Gas Light and Radio, 80 High Street; East Ham Wireless Supply, 427 Barking Road.  
**EALING.**—W. Northfield Radio, 157 Northfield Ave.; Sprace, 241 Northfield Ave.  
**FILTH.**—H. Milner, 114 West Street.  
**FULHAM.**—Western Lighting Co., 250B Northend Road; Thurgood, 298 Wandsworth Bridge Road; Pryce's Corner, 106 Little Road.  
**FOREST GATE.**—H. Bayliss, 96 Wood-Gem Road; A. W. Lay, 10 Station Road; C. H. Gibbins, 56 Stracey Road.  
**FINCHLEY PARK.**—Electron Wireless Co., 208 Seven Sisters Road.  
**GOODMAYES.**—Cheffey & Fuller, 668 Green Lane; Rylands Electrical Co., Goodmayes Road.  
**GREENWICH, EAST.**—A. W. Rose and Son, 163 Trafalgar Road.  
**GREENWICH, WEST.**—Radio Box, 18/18a Blackheath Road.  
**HOLLOWAY.**—S.O.S. Wireless, 149 Holloway Road; S. Laws, 526 Holloway Road.  
**HAMMERSMITH.**—Economic Lighting Stores, 24 Fulham Palace Road; Gas Light Fittings Co., 128 King Street.  
**HIGH BARNET.**—James & Adams, 14 High Street.  
**ILFORD.**—Ajax Co., 291 High Road; A. A. Lesadd & Sons, 237/9 Ilford Lane.  
**ISLINGTON.**—Gas Light & Radio, 371 Upper Street.  
**KILBURN.**—Wuroun Transportable Co., 21 Lonsdale Road; North Western Lighting Co., 40 High Road; Deskophone Co., High Road; Mosedale, 30 Canterbury Road.  
**LEWISHAM.**—H. W. Sutton, 41 Lewis Grove.  
**LEYTON.**—Trumbles, 424 High Road; Seymour Musical Stores, 339 High Road.  
**PECKHAM.**—Peckham Radio, 152a Rye Lane; The Station Parade, Queen's Road.  
**PALMERS GREEN.**—James & Adams, 14 The Promenade.  
**PUTNEY.**—M. Kams & Co., 9 High Street; Western Lighting Co., High Street.  
**PLUMSTEAD.**—Grover & Smith, 136 Plumstead Road.  
**PADDINGTON.**—Mecca Wireless Stores, 29 Praed Street.  
**POPLAR.**—Bottoms & Co., 241 East India Dock Road.  
**RAYNES PARK.**—James & Co., 1a Coombe Lane.  
**ROMFORD.**—Ajax Co., 61a South Street.  
**SHEPHERD'S BUSH.**—W. T. Canaling and Co., Ltd., 47 Goldhawk Road.  
**STRATFORD.**—Wright & Co., 265/367 High Street; J. Jarrett, 131 Leytonstone Road; Martin's Mart, 159 Leytonstone Road.  
**SILVERTOWN.**—Lewis' Charging Service, 69 Saville Road.  
**SOUTHWARK.**—Charles Hills, 856, Old Kent Road; Hugh Polan, Old Kent Road.  
**STOKE NEWINGTON.**—Modern Lighting Co., 212 High Street.  
**TOOTING.**—Western Lighting Co., 77 Mitcham Road.  
**TOTTENHAM.**—Ruskin Accumulator Service, 675 High Street; Hackney Wireless Co., High Road.  
**UPTON PARK.**—G. E. Pryor, 69 Plashet Grove; T. A. Read, 170 Plashet Road; S. Grey & Co., 743 Barking Road.  
**WALTHAMSTOW.**—Gas Light Fittings Co., High Street; R. Wilkin, 12 Blackhorse Lane.  
**WALHAM GREEN.**—W. A. Clarke, 22/24 Market Hall.  
**WANDSWORTH.**—Electric Radio Stores, 21 Tyneham Road, Lavender Hill.  
**WOOLWICH.**—Berestford Lighting Co., Berestford Square.



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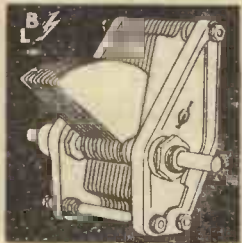
	Type	Fil. Volts	Amps.	Imp. Ohms	Amp. Fac.	
<b>3/6</b> <b>EACH</b> <b>Post 4d.</b>	PR 2	2	.095	28,000	13	H.F. Det.
	PR 3	2	.095	15,000	8	L.F.
	PR 4	2	.095	60,000	32	H.C.
	PR 9	3.5-4	.063	24,000	14	H.F. Det.
	PR10	3.5-4	.063	15,000	8.7	L.F.
	PR11	3.5-4	.063	65,000	40	H.C.
	PR17	5-6	.5	24,000	17	H.F. Det.
	PR18	5-6	.5	15,000	9	L.F.
	PR19	5-6	.15	80,000	40	H.C.
	POWER EACH Post 4d.					
<b>6/6</b> <b>EACH</b> <b>Post 4d.</b>	PR20	2	.15	7,000	6	Power
	PR30	4	.15	8,000	6	"
	PR33	6	.5	8,000	6	"
<b>10/6</b> <b>EACH</b> <b>Post 4d.</b>	PR120	2	.3	3,800	4	Super Power
	PR140	4	.2	4,100	4	"
	Screened Grid EACH Post 4d.					
	SG 25	2	.2	220,000	153	S.G.

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PRICE  
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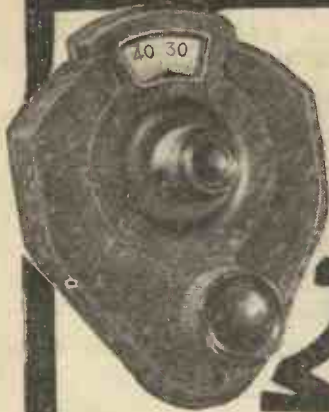
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# LETTERS TO THE EDITOR



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

Correspondence should be brief and to the point and written on one side of the paper.

### "What is a Good Power Valve?"

SIR,—I have read with interest Mr. Reynier's article entitled "What is a Good Power Valve?" in AMATEUR WIRELESS No. 385, and hope he will not think it impertinent if I raise one or two points.

1. He wrote "Let us consider that the power developed in the anode circuit is  $m E_g$ , where  $E_g$  is the grid voltage and  $m$  is the amplification factor." I consider that "power" should read "voltage."

2. He also wrote: "The anode current therefore is this voltage ( $m E_g$ ) divided by the resistance of the valve and loud-speaker in series." Surely the anode current depends upon the values of H.T. and grid voltage, as well as the impedance of the valve and the external impedance. Should not the article read, therefore: "The anode current change . . ."

3. Is the formula

$$P = \frac{m^2 E_g^2}{r} + \frac{n}{(n+1)^2}$$

correct. Should not the + sign be a multiplication sign?

Personally, I think the essential points of this article are not sufficiently explained for the average amateur.

F. E. D. (Cranwell).

SIR,—With reference to the points raised by the letter above, the first point is clearly a slip,  $m E_g$  being the voltage developed in the anode circuit, and not the power.

With reference to the second point, we are considering the dynamic condition of the valve in which we deal with alternating currents and voltages, and in this sense my statement is correct. Strictly speaking, one should refer to the variable component of the anode current or voltage, as the case may be.

With reference to the formula, this is a printer's error, as can be seen by following the line of argument developed in the article. The plus sign should be a multiplication sign, the correct formula reading as follows:

$$P = \frac{m^2 E_g^2}{r} \times \frac{n}{(n+1)^2}$$

J. H. REYNER (Elstree).

### Transmission Quality

SIR,—I am interested in the remarks made by your correspondents W.D. and W.J.F. regarding the harshness of many of the programmes recently broadcast by the B.B.C., and I must say that

I fail to agree with their reasoning. They point out that the harsh nature of the music is unsuitable for reproduction with any kind of speaker.

I do not usually praise the B.B.C., but so far as the quality of their transmissions is concerned I have nothing but praise, and I believe that their broadcasts are as near perfection as possible. The trouble lies not with the transmitter, but with the receiver; and it is up to us to bring our apparatus into line with theirs. I am afraid that we have become so accustomed to the high quality of present-day transformers and valves that we spend far too little time in making final adjustments.

There are many people who do not even experiment with the grid-bias voltage, merely taking the voltage recommended by the makers as final.

It seems evident, too, that many builders of receivers do not appreciate the very great importance of matching valves with the transformer or resistance. There is no excuse for this kind of thing now that all valve manufacturers and all makers of high-class transformers state the impedance of their products. In all cases it will be found that best results are obtained by arranging that the valve has an impedance of one-half to one-quarter that of the transformer or resistance in its anode circuit.

In mentioning these facts, I do not wish to infer that W.D. and W.J.F. have not knowledge of them, but I do feel that many people who make similar complaints do not pay sufficient regard to these things.

In conclusion, I should like to say that I feel absolutely sure that if your correspondents will experiment a little on the lines suggested they will notice a disappearance of the harshness. Of course, one always assumes the use of a fairly good speaker, and nowadays there are very few poor ones.—2BJO (Liverpool).

### South-coast Interference

SIR,—Re letters now appearing in the columns of AMATEUR WIRELESS regarding south-coast interference, I can endorse the complaints up to a point. Since the Prague Plan was adopted one needs a very selective receiver here, and if your correspondents would pay attention to this, much of the trouble would be eliminated. I was troubled in the same way as your correspondent L.B. (Hailsham, Sussex) at the commencement, when Eiffel Tower first went down to its present wave-



length, but the trouble was soon obviated with hardly any diminution of signal strength by simply shortening the aerial from 100 ft. to 20 ft.

"ENTHUSIAST" (Brighton)

#### Faulty Components

SIR,—I notice in a recent issue reference to a correspondent's complaint about certain makers not being willing to replace faulty components. The following are my experiences:—

1. Some months ago I sent an L.F. transformer (that had broken down after four years' use) back to the makers (a well-known firm) and it was replaced free of charge.

2. A few months ago a Mullard valve I had broke down; when tested, the filament was touching the grid. I returned it to Messrs. Mullard, who replaced it immediately. I also returned to them an S.G. valve that was not functioning quite up to standard, and a new one was handed to me.

3. A Blue Spot unit after being in use about six months did not reproduce bass notes as good as when first purchased. Messrs. Hughes & Co. replaced it free of charge.—E. G. S. (Banstead).

Will the Crowborough reader who sent a request to Messrs. Peto-Scott, Ltd., for a catalogue kindly send his full name and address, which were omitted?

#### RADIO LECTURES

REALISING that there are many radio, scientific, school and other societies with vacant dates in their programmes, the Marconiphone Company have prepared three highly interesting lectures, each illustrated with lantern slides, which may be read by any member.

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Secretaries and members who are interested should write to the Marconiphone Company, Ltd., Department I.D., 210-212 Tottenham Court Road, London, W.1.

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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.

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1—Pair Wearite 1930 Binowave Coils ...	1	14	0
1—Parex Screened-grid Valve-holder ...	2	0	
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1—Lissen .0002 fixed condenser ...	1	0	
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2—Lissen 1-mfd. fixed condensers ...	5	0	
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1—Lissen grid leak holder ...	6		
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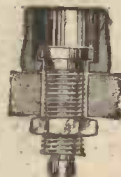
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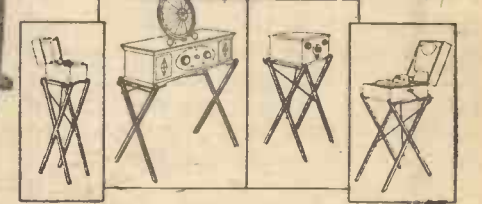
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MODEL  
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# OUR INFORMATION BUREAU



**RULES.**—Please write distinctly and keep to the point. We reply promptly by post. Please give all necessary details! Ask one question at a time to ensure a prompt reply, and please put sketches, 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.

## "B.B.C. Official Crystal Set"

**Q.**—I have constructed the B.B.C. crystal receiver, as described in "Amateur Wireless" dated November 2, 1929, and I fail to get any response from it. The same components have previously been used in other crystal receivers and have previously been found to be satisfactory. Perhaps you will be able to elucidate this apparent mystery for me.—A. S. (London).

**A.**—We are of the opinion that you have misread the wiring plan. It will be seen that wires Nos. 7 and 11 go to the outer edge of the circle representing a plan view of the crystal detector. This point of connection is actually the end metal plate or bush on the crystal detector nearest to the panel. The detector should be slackened off from the panel and the two wires passed round the spindle of detector between detector and panel. The detector should then be screwed up tightly to clamp on these two wires. The wire No. 9 should go to the top end of the detector under the terminal, which is arranged at the end of the detector remote from the panel.—C. L.

## Missing Blueprint Numbers

**Q.**—I have often wondered why it is that

certain of your blueprints are periodically omitted from your printed lists. In my case I have one of your older designs of sets which, by

## 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.

the way, is giving entire satisfaction. The blueprint of this set has long been omitted from your

lists and I have secretly wondered whether this has been due to the receiver not giving the satisfaction originally professed and anticipated for the receiver. In my case the receiver is giving me entire satisfaction, possibly because I adhered strictly to specifications, but knowing that there must be some concrete reason for omitting this set from your lists, I am now taking my courage in both hands and asking the reason. Can you enlighten me.—F. R. (Cornwall).

**A.**—The reason for omitting certain print numbers from our lists is mainly that the issues of our journal describing the actual constructional details of these sets are out of print. For the benefit of those readers who have built certain receivers which have been very popular and who require to replace prints and obtain certain constructional matter, we have instituted a service through our blueprint department which enables readers to obtain the blueprints and a typewritten sheet giving all of the salient points relating to the construction of the receiver. We withdraw the print from our list, however, in order that readers who see the particular title and order the number from this office do not get disappointed with regard to the issue describing it.—C. A.

ABSENT MINDED DOCTOR TO PATIENT :—



"Say-er-....."

Player's  
please!"



N.C.C. 756A



# ELECTRADIX BARGAINS

**CONDENSERS.** New Sterling, 2 mfd., genuine Mansbridge Condensers to 440 volts, at reduced price of 2/10 only. Bass Loud-speaker Condensers, .05, with 5 taps, 5/-; Mains Smoothing, 2 mfd., 1/9. Ironclad Chokes, 1/6. H.F. Chokes, Silk Wound, 1/-; Ebonite Case Condensers, any from .0001 to .001, 8d. each.

**TELEPHONES.** Brown's, headband and cord, 1,500 ohm, 30/-; 120 ohm ditto, 25/-; Sullivan L.R., 3-pair. Single Brown A Receivers, 60 or 750 ohms, 7/6. 2,000 ohms, 12/-. Western or Ericsson Receivers for Pick-ups, 1/6. Wrist Micros, 12/6. Public Address Stand Microphones, 15/-. Speech Buttons, 1/-. Carbon Micro, Insets, 9d. Skinderviken, 2/-.

**HOUSE TELEPHONES,** 12/6 set of two complete stations.

**LOUD-SPEAKERS.** R.K. Cones, fitted B.T.H. Moving Coil, 100 surplus, at only 7/6 each. Marconi L.S. Magnet Pots, 6 v., for Moving Coil Cones, 20/-.

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**L.T. Celluloid, 4 volt, 10/20 amp., 6/3; 4 volt, 20/40 amp., 11/-; 4 volt, 30/60 amp., 12/6.** 3-volt Inert Dura, 1/3. Cell Fillers, 1/6. Hydrometers, 1/-. Petrol Testers, 2/6.

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A super mast.

**OUTFIT with MAST.**—Mast rings, ample galvanised wire (cut to length). Pulley, Cleat, Solid Metal foot rest and strong galvanised stay fasteners. Note.—Our Masts are stayed at 4 ground points (not 3) which ensures safety.

**ACCESSORIES.**—Best Manila Rope Halyards (will not rot), 60 ft. 1/6, 100 ft. 2/6. Special Anti-rust paint (sufficient for mast) 1/6. Coppered earthing tube 1/9. Special Aerial. Has 14 strands of No. 28 gauge Enamelled high conductivity pure copper wire, 100 ft. 3/9.

Money refunded if mast returned intact and carriage paid within 7 days.

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60 Volt. 7/-

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All-wave High-mag. Three (D, 2 Trans) .. AW199  
Knife-edge Three (D, RC, Trans) .. AW201  
Talisman Two-three (D, RC, Trans) .. AW203a  
Wide World Short-wave Three (H.F., D, Trans) .. AW207  
Everybody's Three (SG, D, Trans) .. AW209  
Standard Coil Three (H.F., D, Trans) .. WM117  
Wide-world Short-wave (SG, D, Trans) .. WM120  
New Year Three (SG, D, Pentode) .. WM123  
Lodestone Three (H.F., D, Trans) .. WM129  
Simple Screen Three (H.F., D, Trans) .. WM131  
Dynamic Three (AC-SG, D, Trans) .. WM136  
At Home Three (D, zRC) .. WM141  
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Binowave S.G. Three (SG, D, Trans) .. WM152  
Fanfare (D, z Trans) .. WM157  
Brookmans Three (SG, D, Trans) .. WM161  
Community Three (D, RC, Trans) .. WM164  
New Q3 (SG, D, Pentode) .. WM167  
Brookmans Push-pull Three (H.F., D, Trans) 1/6 WM170

## FOUR-VALVE SETS (1s. 6d. each)

Overseas Short-wave (H.F., D, 2 Trans) .. AW133  
Clarion All-electric Three (SG, D, Trans, AC Rectifier) .. AW200  
\*Music-lover's Gramo-radio (SG, D, RC, Trans—1s. 6d.) .. AW202a  
\*Music-lover's Gramo-radio (Loud-speaker—1s.) .. AW202b  
\*Music-lover's Gramo-radio (Motor-board—9d.) .. AW202c  
Binowave Four (SG, D, RC Trans) .. WM119  
Standard-coil Four (H.F., D, zRC) .. WM122  
Dominions Four (zSG, D, Trans) .. WM134  
Short-wave Adaptor for Dominions Four .. WM140  
Music Player (H.F., D, RC, Trans) .. WM144  
Arrow (SG, H.F., D, Trans) .. WM154  
1930 Monodial (zSG, D, Trans) .. WM158  
Electric Four (All AC—SG, D, RC, Trans) .. WM162  
Outpost Four (SG, D, 2 Trans) .. WM165

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All-wave Lodestone Five (H.F., D, RC, Push-pull) .. WM146  
1930 Five (zHF, D, RC, Trans) .. WM171

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Beginner's Amplifier (1 v.) .. AW210  
Signal Booster (HF Unit) .. WM128  
Auditor Amplifier .. WM132  
Concentrator (HF Unit) .. WM169

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Short-wave Adaptor (1 v.) .. AW183  
High-tension Battery Charger .. AW191  
Mains Unit for S.8 Valves .. AW193  
Scratch filter (6d.) .. AW195  
Simplest H.T. Unit .. AW197  
B.P. Wavetrap (6d.) .. AW204  
H.T. Unit for A.C. Mains .. WM125  
Lodestone Loud-speaker .. WM126  
James H.T. Unit for D.C. Mains .. WM133  
Two Ampere Low-tension Unit .. WM147  
A.C. Mains Amplifier .. WM149  
A.C. Mains Unit for All-wave Lodestone Five .. WM151  
H.T. Unit for A.C. Mains .. WM159  
"W.M." Linen-diaphragm .. WM172

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Arcadian Portable (SG, D, 2 Trans) with linen-diaphragm loud-speaker (half scale) .. AW177 1/6  
5.5.0 Portable (D, Trans) .. AW181 1/6  
Holiday Portable Three (D, RC, Trans) .. AW188 1/-  
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Wayfarer Portable (Super-het) .. WM139 1/6  
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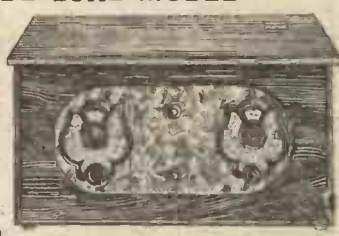
AMATEUR WIRELESS 58-68 FETTER LANE LONDON, E.C.4

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Come to LEICESTER SQUARE TUBE.

This address is at the back of Daly's Theatre Phones: Gerrard 4637 and 2821

WE ARE OPEN  
ALL DAY SATURDAY  
ALL DAY THURSDAY  
ALL DAY EVERY DAY  
Hours 9 a.m. to 8 p.m.  
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TUNEWELL  
DUAL RANGE  
6 PIN 7/9  
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SENSATIONAL OFFER  
IN LOUD-SPEAKER  
SETS (NOT PARTS)

DE LUXE MODEL

READY TO  
USEIn Handsome  
Cabinet  
Receives Lon-  
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5XX & many  
Continental  
Stations.

NO COILS TO CHANGE

JUST SWITCH ON—THAT'S ALL  
MULLARD MASTER 3' CIRCUIT

This new and wonderful set must appeal to Young and Old, amateur and experimenter—in fact, EVERYBODY! COMPLETE as shown, in Cabinet (hinged lid), all parts enclosed, Tunewell Dual Coil 200/2000 metres, 3 Latest D.E. Valves, Grid Bias, Battery Cords, Slow Motion Tuning. READY FOR USE

Packing &amp; Carr. 5/-. NOT C.O.D.

COMPLETE as shown, with

THE LOT

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Carr. &amp; Packing, 7/6

NOT C.O.D.

12 MONTHLY

PAYMENTS OF

13/11

Carriage 5/-

UNSOLICITED TESTIMONIAL.

"Congratulations! most amazing results."

A. WALL (Proof A.W.)

KITS OF PARTS

Quoted for at a special cash price where possible on receipt of detailed list.

All Post Orders in rotation.

over 25/-

IN VALUE

EVERYBODY'S 3

COMPONENTS

2 Igranite .0005 at 10/6 (or Ormond at 6/-), .0003 Formo, 15 ohm Sovereign, S.G. holder 2/-, 2 Spring V.H. at 1/3, .0002 Fixed, 2 .0001, 2.1 mfd., 3 meg. leak, Lewcos Fixed Potentiometer, Telsen Grand, 12/6 (or Varley, 15/-), Screen 10x6, 2/6

If your order is over 5 0/- you can buy for 1/6 extra

Panel, 13 Terminals, Wire, Grid Leak, Holder, Dial Indicators, Panel Brackets, Carriage 1/-

BINOWAVE 1930

COILS, 34/- pr.

Offered subject delivery.

## TALISMAN 2

KIT OF PARTS. A.W. Aug. 3rd .0003 S.M. Condenser, .0002 Reaction, 3 Spring V.H., .0002 and Series Clip, 2 meg., Wearite Talisman Coil 7/6, H.F. Choke, Lotus L.F., Type "J" Formo P.P. Switch, Panel, Strip, 8 Engraved Terminals, Baseboard, Wire, Plugs, Clips

49/6 Cash Post Free

Complete Ready to use in American Type Cabinet, Power and Detector Valves, Tested, Tax Paid. 70/- Carriage 2/6.

SET CAN BE SUPPLIED WITHOUT VALVES OR CABINET if DESIRED.

TALISMAN 2-3

KIT OF PARTS

All selected specified—.0005 variable, Talisman coil, .0002 reaction, 3 spring V. holders, .0002 S/P, .005 fixed, 1 mfd., 2 meg., 1 meg. holder, Formo "J", 30,000 ohm and holder (W.W.), H.F. choke at 5/-, L.F. Telsen Grand 12/6, 8 marked terminals, wire, flex, panel, screws, baseboard, slow motion dial.

THE LOT 59/6

CASH PRICE

Not C.O.D.

EASY TERMS

KIT OF PARTS

14x7 Cabinet, 2 D.E. Valves, 100-v. H.T., 2-v. L.T., Cone Speaker, Aerial, 12 Monthly Payments of 13/11

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J.B. Condensers, R.I. Chokes Transformers and all usual products, Lewcos Coils, Chokes, etc., Ekeo Mains Units, Amplification Speakers, Brown Speakers, and all components, 'phones, etc., Ferranti, L.F. Transformers, Chokes, Anode Resistances, Cossor, Mullard, Osram, Ediswan, Marconi Valves, Varley Chokes and Transformers, Ormond Condensers, Dials, etc.

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Marconi Mullard Cossor, Osram, 10/6. Power, 12/6. S.P., 15/- S.G., 22/6. Pentode, 25/- Sets of valves for all Cossor, Mullard and Osram kits of parts, etc.

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Blue Spot Unit 60K, 25/-; Chassis, 12/6; Do. Major, 15/-; B.T.H. Chassis, 12/-; Unit, 15/-; Brown's Vee Unit, 25/-; Chassis, 15/-; Amplion Cone, 21/-; A.C.40, 23/-; A.R.9 Horn, 27/6; Celestion C10 75/-; Marconi Octagon, 30/-; B.T.H. C.2, 37/6; Blue Spot 40, £2. 7. 0.

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Always large stock:

4-Pole Unit, 12/6; Chassis, 7/6; 5 Valve Portable, £15; Cabinet Speaker, (O or M), 29/6; Do. Special Model, 50/-; Reaction, 4/-; Differential, 4/-; Friction Control Condensers: .0005 12/-, .00035 11/3, .00025 11/6; No. 3 Log, .0005 6/-, .00035 5/9, .00025 5/6; Slow Motion Dials, 5/- and 3/6; 55 to 1 Friction Dial (Dual), 7/6; Turntables, 5/-; Rheostats, 7/- Postage under 6/-.

TUNEWELL COILS

for CLARION, 10/6 each

QAT COILS 15/-

Wearite

TALISMAN DUAL COIL 7/6

Wearite Magnetic Reaction

NEW CATALOGUE

READY 1/-

Refunded first 10/- order.

Set of 4 SHORT-WAVE COILS 7/6

2, 4, 6, 9

## EASY TERM

12/6

PER MONTH

For 12 Months

Carr.

Flat or householder form.

LISSEN 2 volt

POWER PENTODE

TAKES ONLY 7 M.A.

Personally Recommended

BRITAIN'S FAV. 2

(UP-TO-DATE)

COMPONENTS

Ormond .0005, 6/-; .00025, 5/6; 1 ohm Ormond, 2/-; 2 W.B. V.H. 2/6; 6 pin Base, 2/-; .0003 au Series Clip, 1/6; 2 meg. Leak, 1/-; H.F. Choke, 5/6; L.F. Transformer, 8/6; Push Pull, 1/3; Tunewell Dual Range Coil, 7/6. All 14x7 Ebonite Panel, Pair Panel Jmadsen, Baseboard, Battery Clips, 8 Engraved Terminals, Wire, Flex, Plugs.

The above Lot - 45/-

Carr. Paid (NOT sent C.O.D.)

DARIO VALVES

Radio Micro

2 volt or 4 volt

Universal, R.C., or

Super H.F. each 5/6

Super Power ... 7/6

Hyper Power ... 9/6

CLARION 3 (S.G.)

SET OF PARTS with

Coils, Panel &amp; Base-

board. Post Free 70/-

KNIFE-EDGE THREE

A.W. Sept. 21/29

(Mr. Keyner)

De Luxe .0003, .00013, Ormond 400 ohms, "Q" Aerial, any good make in stock, 15/-; 3 Spring Valve Holders, T.C.C. .0003 8/P 2 meg. leak, Lissen R.C. Unit, P.P. Switch, H.F. Choke (any good make) about 5/6, Igranite 6/-, 17/6, 4 Engraved Terminals, Brackets, Formo-dens

Total £2-19-6

For 2/6 extra

WITH ABOVE PARTS

YOU CAN BUY

Ebonite Panel 1d by 3 3 Strips, Tube, Wire, Flex, Plugs, Spades, 1d by 10 Baseboard, 2 4-in. Dial, Not C.O.D.

BRITAIN'S FAV. 3

(Still going.)

KIT OF PARTS, Panel, and

Baseboard. 63/-

Full List Free.

UNSOLICITED

TESTIMONIALS

£50 TO ANY CHARITY

IF NOT GENUINE

From Mr. A. Wall, of Spark-

hill, Birmingham, 7/11/29:—

Sir—Thank you for set,

etc., for which I am very

proud: it is all it claims. I

was extremely astonished; its

merits are unequalled.

Wishing you sets, every

future success, and thanking

you again, I remain,

Yours sincerely,

(Signed) A. Wall.

From Francis Shaw, of Otley,

Yorkshire, 9/11/29:—

We have received the wire-

less set in good condition.

We are very satisfied with it,

and thank you for the

courtesy shown to us.

I am, yours faithfully,

(Signed) Francis Shaw.

From A. C. Morton, of Hart-

ley Winney, 3/10/29:—

Dear Sir—Have received

wireless set, etc. (yesterday).

I am more than pleased with

same. It has surpassed my

expectations, and you can be

sure I shall recommend your

firm in future to my friends.

Yours truly,

(Signed) A. C. M.



**YOUR OWN HIGH-TENSION AND ALL-POWER UNIT**

**MACROIX**

Unit Components.

DETAILS OF PARTS FOR:

8G50, 8G80 Det. 60, 150 max.	£1 16 6
Unit, 6 Variable Voltages	£2 2 6
Variable Voltages	£2 19 9
Set, complete with valves, charging	£1 15 6

Wiring Diagrams Free. State A.C. or D.C.

From your dealer or direct from

**THE WHOLESALE WIRELESS COMPANY**

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LYONS' NEW "B.A.T." (Best-After-Test) QMB Switch breaks 3 amps. at 250 volts!

For H.F., L.F., H.T., L.T., circuits. For A.C. Sets, Mains Units, Gramo-Motors, and as Moving Coil Speaker Field Switch, etc. Send for FREE 4-pp. circular; request at the same time our famous 36-pp. "CLAROSTAT" Book (all about D.C. and A.C. Mains Units, with scale drawings).



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LIVERPOOL : ENGLAND

## £ - s. - d. (SAVED)

### NO RUBBISH SUPPLIED

PANELS for ORGOLA receiver 3/6, Coils 15/-. All kits in stock. Corsor, Mullard, etc., Ebonite panels cut to size at keen prices; get our price list.

Master 3 Type coils B.B.C. 3/3, 4/9. Titan type 9/6 S.G.P. B.B.C. pair 6/-. 7/9. Dual 5/9. Six-pin bases 1/3, with switch 3/3. Formers 1/9, 2/3. R.C. Units 3/6. Four-pin Corsor type coils 6/9 pair. S.L.F. Condensers 0005, 3/3, 3/6, Mid Log, ball bearings 3/6. S.M. dials 2/3. Reaction 2/9. Alumn. panels 2/4. Cone Chassis 6/6. P.P. switches 9d. Phones pair 6/6. H.F. Chokes 1/6, 2/-. 3/-. Combined 3/3. Engraved term. 2/6 doz. All wave tuners 7/11. Valve Holders B/B 9d. Volt Meters 5/6. Cleartron Valves 3/-. Stamp for List. Everything Wireless. £1 orders post paid. Get our coupon, it saves you Money.

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## EXACT TUNERS

250 to 2,000 metres  
Thousands of these tuners are in use, and we can strongly recommend them. No further coils are required. Send P.C. for particulars and circuits. FREE.

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By Ernest H. Robinson (5 Y.M.)

A handy book telling in plain, non-technical language all that the average man needs to know about Wireless.

**ASSELL'S 3/6 net**

## Designing the "1930 Ether Searcher"

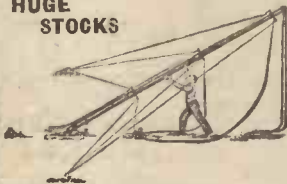
(Continued from page 866)

station, and for this reason some definite system of controlling the volume is desirable. In the new "Ether Searcher" volume can be controlled from a mere whisper right up to the immense maximum intensity of sound possible.

Nearly every listener has an aerial with characteristics peculiar to itself; that is why some sets work well on some aerals and not on others. We have made special provision for this variation in aerial characteristics; as a result, every constructor can adjust his set to suit his own particular aerial. The set will then tune in dozens of stations on exactly the same dial readings as our original set. We are, at present, compiling a full list of dial readings of every station picked up on the "1930 Ether Searcher." It is a formidable list and should prove of great value as an identifier of foreign stations.

As announced elsewhere in this issue, next week will be the Christmas number of AMATEUR WIRELESS, wherein we shall give full details of the construction and operation of the "1930 Ether Searcher." We should like to emphasise the fact that this set is, above all things, simple and cheap to build. Remember, it is all explained in the Christmas number of AMATEUR WIRELESS. Have you ordered a copy?

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### AMAZING BARGAINS In Efficient STEEL MASTS

**26ft.** STEEL MAST, tapering 1 1/2" to 1". Carriage: London, 1/6; Midlands, 2/6; Elsewhere, 3/6. Weighs 28 lbs. **8/-**

**34ft.** Tapering 1 3/4" to 1". Carriage: London, 2/-; Midlands, 3/-; Elsewhere, 4/-. Weight 40 lbs. **11/-**

**40ft.** Tapering 1 3/4" to 1". Carriage: London, 2/6; Midlands, 3/6; Elsewhere, 4/6. Weighs 50 lbs. **16/6**

A super mast.

**OUTFIT with MAST.**—Mast rings, ample galvanised wire (cut to lengths), Pull-y, Clat. Solid Metal foot rest and strong galvanised stay fasteners. Note.—Our Masts are stayed at 4 ground points (not 3) which ensures safety.

**ACCESSORIES.**—Best Manila Rope Halyards (will not rot), 60 ft. 1/6, 100 ft. 2/6. Special Anti-rust paint (sufficient for mast) 1/8. Coppered earthing tube 1/9. Special Aerial. Has 14 strands of No. 23 gauge Enamelled high conductivity pure copper wire, 100 ft. 3/9.

Money refunded if mast returned intact and carriage paid within 7 days.

**FAIRFIELD TUBE CO.**  
6, Southend Road, BECKENHAM, Kent

## SUPER RAZOR BLADE SHAVES 1,000 TIMES

Blade guerdine solved. Thousands used. No failures. Send postcard for proof. Costs nothing to test. RAZOR PATENTS SYNDICATE, 3, Trinity Road, Birmingham.



**BEAUTIFY YOUR SET!** Radio Furniture De Luxe from £3 15s. to £11 11s. Sent ON APPROVAL—you may return at our expense if you wish to part with it. Used by Radio Press—over 2,000 clients.

**PHOTOGRAPHS & LIST 3d.**  
Pickett's Radio Furniture Workshop (A.M.) Bexley Heath

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**WIRELESS PORTABLE SETS with Five New Corsor Valves** for nine guineas. Less than components cost. Comparable with any set double this price. Beautiful Suitcase; two aerial windings; English Batteries and Accumulators. All inclusive, efficient sets. Royalties paid. A magnificent Xmas gift. If you are in London, may I fix an appointment. If you are not in London, may I send you particulars. G. Hodgson, 53 Windsor House, Victoria Street, Westminster, London, S.W.

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SAVE YOUR ACCUMULATORS SET A SINKER SENTRY! HE'LL NEVER LET YOU DOWN.



Double the life of your cells! Avoid being let down by a run-out accumulator. Sinquers tell you the exact state of your battery and warn you when it needs recharging. Just drop them in and leave them to it. 1/- per carton from most dealers or 1/3 post free from actual makers.

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Leyton Primary H.T. Battery, P1 Porous Pot Cells, S1 & S2 Sac Cells. All complete for assembly.

	1-cell.	6-cell.	12-cell.	30-cell.
P1	6d.	3/3	5/9	14/-
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"Easeful" Filler: 1/- pint 1/-; Pint 1/6. Post 3d extra

Send 1d. stamp for booklet giving full particulars to—  
**THE LEYTON BATTERY CO.,**  
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Solves all H.T. Troubles.

**SELF-CHARGING, SILENT, ECONOMICAL.**

JARS (waxed), 2 1/2 in. x 1 1/4 in. sq., 1/3 doz. ZINCS, new type, 10d. doz. SACS, 1 1/2 doz. Sample doz. (13 volts), complete with bands and electrolyte, 4/1 post 9d. Sample unit, 6d. Illus. booklet free. Bargain list free.

**AMPLIFIERS, 30/-, 3-VALVE SET, £5.**  
**A. TAYLOR, 57, Studley Road, STOCKWELL, LONDON.**



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Or buy Cabinets for Wireless. At a quarter shop prices. Order Set as shown. British double spring motor 12in. velvet turntable, swan arm, metal soundbox, amplifier, needle cups for £1. 18. 6 p.p. and build your own Cabinet. Machines sold by others at £10-£20 do not contain better fittings. Motors from 8/6. Repair parts. Lists free, 64 pp. 1930 Catalogue drawing and how to make Gramos 3d.

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## BUILD £20 GRAMOPHONE for £3

Instructions 3d. Latest Internal Horns and Motors. Lists Free.  
**W.H.G., 185, High Street, DEPTFORD, S.E.8**

**Amateur Wireless**

**COUPON**  
Available until Saturday,  
**DECEMBER 7, 1929**



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**DUMETOHMS**  
25, 5, 1, 1/5, 2, 3, 4, 5 and 10 Megohms. Other Higher Values specially to order. Each 2/6

**RESISTORS**  
Any standard value. Each 1/-  
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**DUWIRO:IMS**  
10,000 to 100,000 ohms 5/-  
150,000 and 200,000 ohms 8/-  
250,000 ohms 9/9  
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Holder (horizontal type) 1/6

If unobtainable from your dealer write direct to us giving his name and address.



Free for the asking—  
"A Bit about a Battery." There's a copy for you at your dealer's.

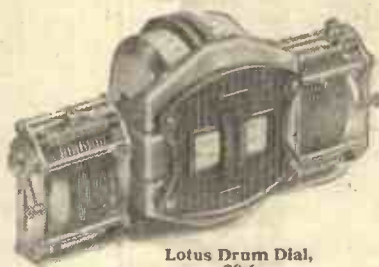
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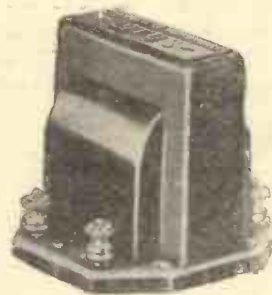
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Lotus Drum Dial,  
29/6



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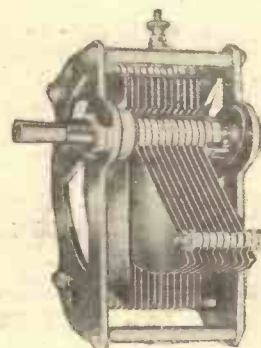


Lotus L.F.  
Transformers,  
12/6

Build strength, efficiency and reliability into your set. Build with success and enjoyment. Build with Lotus components.

Every Lotus component, from a variable condenser to a simple switch, is the product of experience and experiment—a masterpiece of mechanical perfection.

Lotus components are easy to fix, quick to assemble, neat, compact and sturdy. They work together in perfect harmony and ensure instant fulfilment of your highest hopes.



Lotus Variable  
Condensers,  
from 5/-

From all Radio Dealers

# LOTUS COMPONENTS

GARNETT, WHITELEY & CO., LTD., LIVERPOOL



# ON WORLD'S LONELIEST ISLAND!

**Where letters come once a year, Marconi Valves keep touch with civilization**

TRISTAN DA CUNHA! In mid-ocean — 3000 miles from America — 2000 miles from Africa. Ship calls once a year. Yet every day islanders get World's latest news — concert from Europe — dance music from New York — *through Marconi Valves.*

Chaplain of Tristan da Cunha uses Marconi Valves in radio set — island's only constant link with outer world. Because of their reliability, their wide range, their long life. *They would improve your set, too.* Make its tone clearer. Give it greater volume. They fit any set. Cost not a penny more.



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*The first and greatest name in wireless*



Write for an interesting valve catalogue to Marconiphone Company Limited, 210-212 Tottenham Court Road, London, W.1