

MAKING A SIMPLE COIL WINDER :: MICROPHONE HINTS AND TIPS

Amateur Wireless

3^d
Every
Wednesday

and
Radiovision

**MY "RADIO
EXCHANGE"**

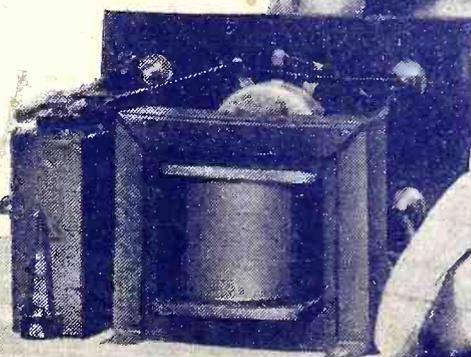
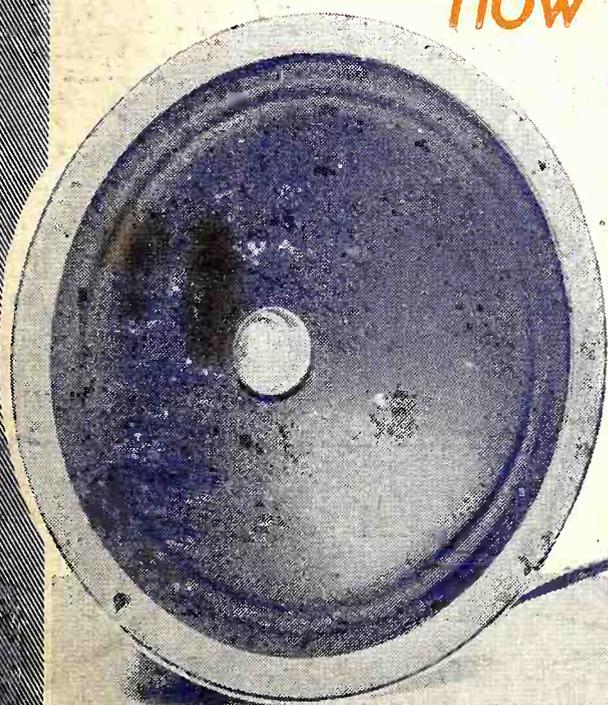
**INDIA ON
SHORT WAVES**

**CRUSADERS'
CORNER**

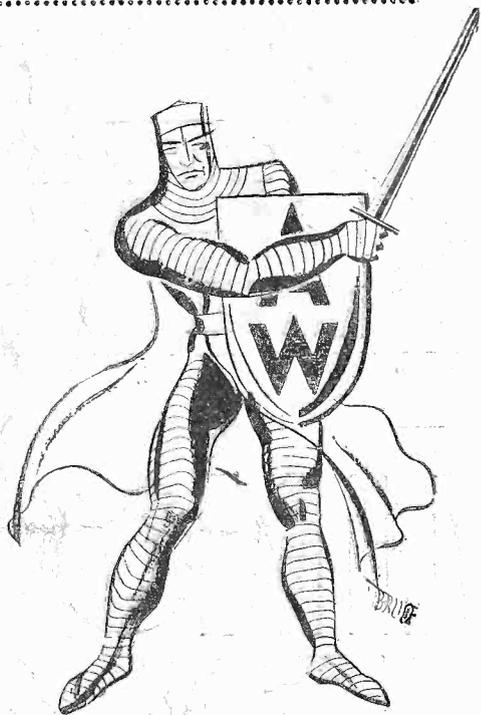
**STOP THAT
NOISE!**

CONTROLLING THE TONE

*How to Make Two Simple
Output Units*



IF You Want a Free Blueprint of the ALL-BRITAIN THREE Join the Constructor Crusaders



THE PRIVILEGES OF MEMBERSHIP

- 1.—Immediately on enrolment every Constructor Crusader receives free full-size photographic blueprints of the All-Britain Three (described Oct. 6) and of the Crusaders' A.V.C.A (published on August 18). He will also receive a free blueprint, immediately on publication, of the two "Amateur Wireless" star sets to be released on January 23 and March 13, 1935.
- 2.—Every member will also be entitled to free technical advice in connection with any or all of the four special Crusader sets mentioned above (each query must be accompanied by a stamped and addressed envelope for the reply). In the case of queries regarding any other "Amateur Wireless" sets the usual rules of the Information Bureau must be observed.
- 3.—All Constructor Crusaders are invited to contribute ideas and suggestions to the Constructor Crusaders' Corner. Constructive suggestions will be specially helpful and will be interpreted by the "Amateur Wireless" Technical Staff as far as possible to the advantage of all set builders.
- 4.—Immediately his application for membership has been approved every Constructor Crusader will receive a certificate of membership. Note that the membership number must be quoted in all future correspondence.
- 5.—Constructor Crusaders will be authorised to wear the badge of membership. Badges for buttonhole wear can be obtained for 1s. extra each, post paid.

WHAT THE CONSTRUCTOR CRUSADER UNDERTAKES

To further the interests of home construction in every way that may present itself, and to encourage as many people as possible to take an active interest in the greatest hobby ever invented.

To do everything possible to raise the standard of radio reception —by making suggestions and by using only the best and newest methods and circuits so that other listeners will realise what great strides radio makes from year to year.

To build at least one new set every year and not to make do with an old receiver that should have been scrapped, or at least rebuilt, years ago.

To report on the performance of every new set made up and tried out—and to make reasonable and fair criticisms.



To Constructor Crusaders, "Amateur Wireless,"
58-61 Fetter Lane, London, E.C.4.
(Enclose in envelope bearing 1½d. stamp.)

Please enrol me as a member of the Constructor Crusaders. I enclose postal order for 1s. to cover postage on four free blueprints and office expenses (and also an extra 1s. for buttonhole badge).* It is understood that I shall be entitled to free technical advice on any matters concerning the four free blueprint sets. My name and address are:

December 29, 1934

Value of Postal Order Enclosed	For office use only.			
	No.	C	B	L
*Delete if not required				

Join Now by Completing the Membership Form

Editor-in-Chief:
BERNARD E. JONES

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

Radiovision Editor:
H. CORBISHLEY

Amateur Wireless and Radiovision

Editor:
D. SISSON RELPH
Research Consultants:
W. JAMES and
PERCY W. HARRIS
M.Inst.Rad.E.
Assistant Editor:
ALAN HUNTER

Published by BERNARD JONES PUBLICATIONS, LTD., 56/61 Fetter Lane, London, E.C.4. Telephone: Central 4341 (four lines). Telegrams: "Beejabee, Fleet, London." Subscription post paid to any part of the world: 3 months, 4s. 6d.; 6 months, 8s. 9d.; 12 months, 17s. 6d. Published on Wednesdays and dated for the following Saturday.

News and Gossip of the Week

Unlucky Newcastle

WITH a spot of fading on Droitwich and interference on the local transmitter, listeners in Newcastle have been unlucky lately.

Interference was traced to foreign stations on same wavelength and as a result of international action Newcastle transmitter is now clear of trouble.

Serious Trouble

THIS Droitwich fading may be aggravated by seasonal conditions, but as the weeks slip past conviction is growing that trouble is more serious.

Fading is reported from reliable sources at distances of one hundred miles and upwards from the transmitter and the B.B.C. will no longer confirm that it is no worse on Droitwich than it was on Daventry.

More Expenditure

FURTHER tests reveal that it is more troublesome, though the areas affected are different, of course. Research engineers are still investigating and changes are likely before next autumn.

The B.B.C. has never been afraid to spend money once it is convinced that expenditure is necessary.

Carbon Mikes

WHILE moving-coil microphones were used in Westminster Abbey for relaying the Royal Wedding, the King spoke into a carbon type on Christmas Day at Sandringham.

The three Australian walnut cases—two for microphones and one for a red signal light—were placed on His Majesty's study table in exactly the same positions as last year.

These cases were made to hold carbon microphones, and other types would not have fitted. Reproduction was perfect, as you heard.

Measuring Interference

GERMANY has decided views about methods of measuring interference, and international experts are meeting in Berlin to test different systems.

The aim is to choose a method that might be used as a standard, and several systems are being demonstrated.

New Announcer

PROGRAMMES FOR the Empire get more elaborate every month. The new orchestra engaged to play during the night is broadcasting symphony concerts to Canada in the small hours.

Under the spur of competition from foreign short-wave stations, production is being developed and a new announcer has just been appointed.

He is Mr. R. N. Dougall.

Another Regional Scheme

FRANCE is progressing with her regional scheme which provides for high-power stations at Paris, Lille, Lyons, Marseilles, and Toulouse.

The latest development is a plan for a new colonial transmitter more powerful than the present one.

Germany Leads

IN the Beromünster concert relayed from Basle we had a chance to compare the Basle, Paris, Boulogne line with the La Panne, Ostend, Aachen, Berlin circuit more often used for Continental relays.

The Berlin route is composed entirely of music circuits while the line to Basle through Paris uses for a considerable stretch telephone circuits which have been improved.

Germany still leads in the development of lines for broadcasting.

Still Testing

POSSIBLE sites for the North-Eastern regional stations are still being tested.

The performance of each B.B.C. station has been carefully measured during the past twelve months, and polar diagrams confirm the extreme importance of a site.

Armed with this knowledge, engineers on the job up North are leaving nothing to chance.

Bigger Post-bag

THE B.B.C. reports big increase in programme correspondence during the year. Figure is one hundred and fifty thousand letters for the twelve months just ending.

Suggestions, requests, and inquiries made up the bulk of the

post—replies were sent to all letters bearing signatures and addresses, but no notice was taken of anonymous letters and post cards.

Cuts No Ice

MOST letters express or imply appreciation of items broadcast. Some correspondents threaten to give up wireless unless a particular artist is banished forever from the studios.

This type of letter cuts no ice, but the B.B.C. welcomes suggestions and all reasonable letters, whether critical or otherwise are carefully read.

1935 Plans

THE B.B.C. is making plans for 1935. "In Town Tonight" continues on Saturday evenings for the first three months of the New Year, and Henry Hall's guest nights will be heard once a fortnight.

The "Air-do-Wells" and the White Coons will be broadcast at intervals, and John Watt is starting a new series of "Songs from the Films."

Most of the new features which have become popular during the past few months remain for the rest of the season in the Variety Department schedule.

Sophistication!

ON January 16, the B.B.C. will start a new type of entertainment—10 o'clock revues for the sophisticated.

This quick-fire entertainment will appeal to the West-End element in the B.B.C. audience—and will be given once a month.

Marking Time

MANY writers are guessing the result of the Television Committee's findings. We prefer to await facts.

Meanwhile, though, the 30-line transmissions from London Nat-



Are these happy kids listening on this Cossor radio-gramophone to their own "hour"—or have they chosen Henry Hall instead?

ional on the medium waves continue to go from strength to strength in the artistic sense.

In the New Year, Robin Whitworth will return from the North Region to help Eustace Robb.

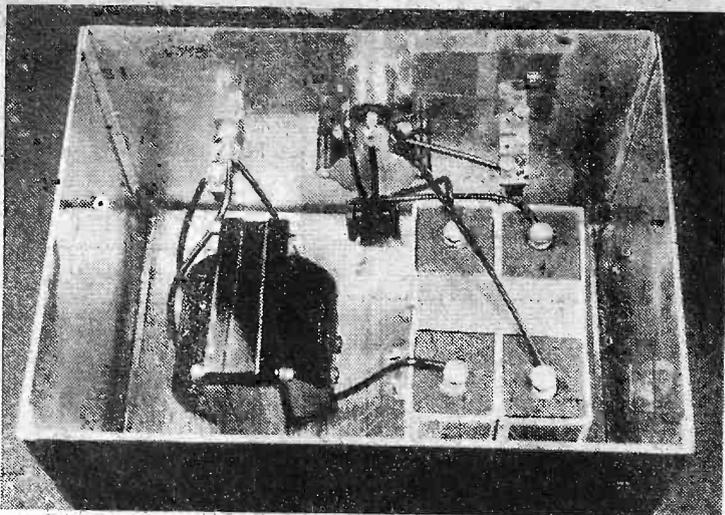
Chain of Stations?

TALK of a chain of short-wave stations being erected by the B.B.C. for ultra-short-wave high-definition television programmes is rather wild, we imagine.

Because it is certain that before any such expenditure was envisaged, a lot of experimental work would be done on the erection and transmission from a single station.

What is wrong with the existing transmitter on the roof of Broadcasting House?

Microphone Manipulation



View of the inside of the microphone unit described in this article. Note the screening box

THE theoretical circuit showing the connections for a microphone and the necessary input transformer and energising battery is very simple indeed, but when it comes to actually using a microphone with a radio set or amplifier it is another pair of boots.

If you know how to go about it, the connection of a microphone to an amplifier is simplicity itself, but if you don't know anything about it there are several little snags which will cause very big difficulties.

Loud Hum

It is a common trouble, for example, for a loud hum to be set up when using fairly long microphone leads or by leaving the microphone transformer close to the mains. Sometimes the hum is caused by induction between the house-lighting and the microphone-input transformer.

Again, very few readers know just what type of transformer is wanted before the microphone can be used with a receiver.

From time to time when we have told readers they want a 1 to 25 ratio transformer they have written back querying this and asking if we did not mean 1 to 2.5.

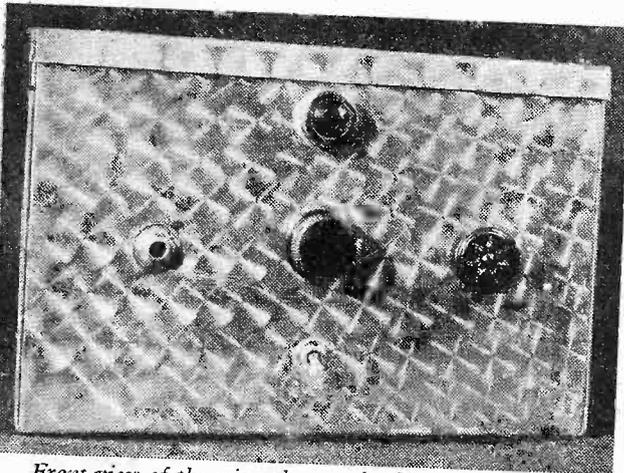
Very often, too, readers have made the mistake of connecting the energising battery in series with the secondary of the input transformer instead of in the primary.

We thought it would be an excellent idea to make a standard unit, fitted with two plugs so that any microphone can be coupled to any set in the proper way. This would automatically make quite sure that the wiring is correct. It would eliminate possibilities of hum due to induction and, as the whole unit is encased in a metal box complete with volume control, indicating lamp, and master switch, the possibility of break-down is minimised.

Just What You Want

If you have a receiver that has at least one good low-frequency stage or an amplifier either of the simple battery or A.C. type, this unit is just what you are wanting. You can see from the illustrations that it is fitted with two plugs and jacks. The one on the left-hand side is for

A useful microphone sold by *Electradix Radios model 12T* at 18s. 6d.

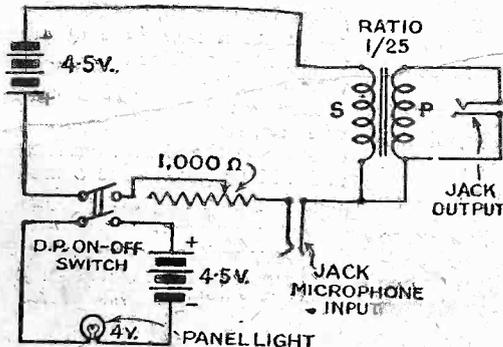


Front view of the microphone unit. Note the jack switch

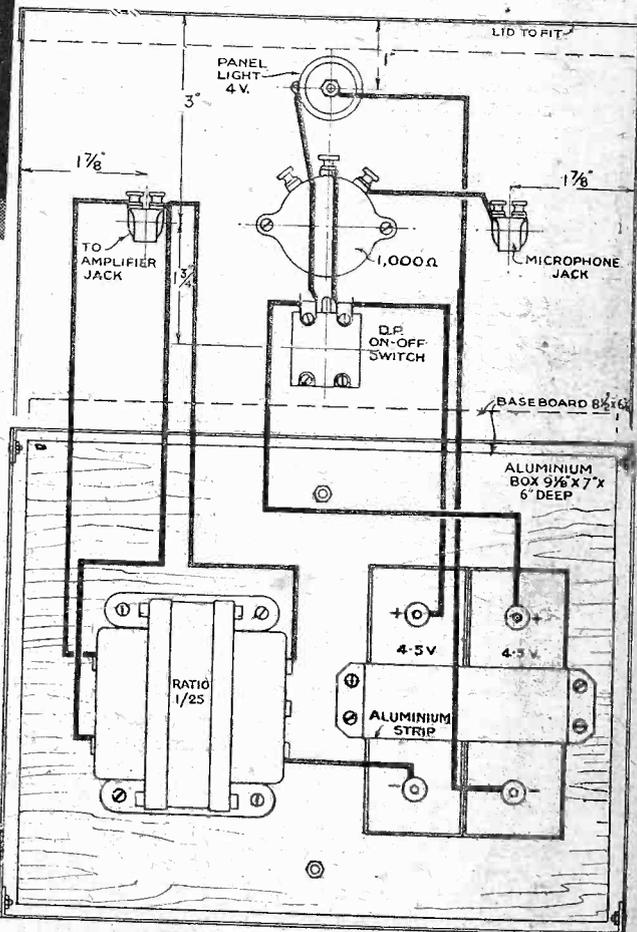
the microphone, the one on the right-hand side is for the connection from the receiver or amplifier.

You will see that one side of both of these sockets is at earth potential, so is one side of the primary and one side of the secondary of the input transformer.

In this way one side of the microphone is automatically earthed when it is connected to the input



Circuit of the microphone input unit, which incorporates a volume control



Layout and wiring guide of the unit. No full-size blueprint is available

of an amplifier. This reduces any likelihood of external pick-up and low-frequency instability. The 4½-volt energising battery is in series with the microphone and a 1,000-ohm resistance.

This resistance is a volume control but if you are using an inexpensive microphone which is likely to howl, reducing the voltage applied to it, by means of the volume control you can generally overcome the trouble.

Red Indicating Lamp

If you lend your microphone and amplifier to a friend very often the energising battery is left in circuit so that next time you wish to use it the battery is completely run down. To prevent this, we have included a red indicating lamp which only lights up when the battery is switched on.

The components you will need are quite standard and it is immaterial what make they are providing they are of the correct value. Do make quite sure that the transformer is a good one, otherwise you may suffer from lack of bass. We used a Ferranti RD124 1-25 ratio.

Continued on page 678

'Ware Wire!

Says **PERCY W. HARRIS**

M. Inst. Rad. E.

A FEW years ago there was an epidemic of so-called "burnt-out" low-frequency transformers. Component manufacturers tore their hair; dealers trembled every time the shop door opened, in case it was still another customer returning a transformer that had failed; wire manufacturers tried to think up new excuses for avoiding meeting their best customers, but still the trouble went on.

Fine Wire To Blame?

Because it enables plenty of turns to be wound in a small space, very fine gauge wire had been used, so everybody came to the conclusion that this was the real cause and, accordingly, even regretfully, the transformer makers turned to larger gauges.

Well, nothing happened. Or rather, nothing stopped happening. Transformers still broke down with pitiful regularity until one day a little light was thrown on the subject by some experiments which showed that even the finest wire that had been used would carry, without fusing, far more current than any valve then available for reception would ever pass!

Evidently, then, fusing by the current passed was out of the question. Microscopic examination of the breaks now showed a tiny green stain on the surrounding insulation, and *not* any sign of heating and fusion. The breakdowns, all along, had been caused by corrosion.

Impregnated With Wax

Just how had this corrosion occurred? How could anything corrosive get into the inner windings which in many transformers were not merely shielded, but absolutely *impregnated*, with wax?

Examination of the conditions of winding showed that the bobbins were spun round by machinery while the girl operators guided the frail wire by running it over their fingers. Every now and again a microscopic drop of perspiration adhered—sometimes of quite an acid character—and there was your potential breakdown!

Nowadays the girls hold the wire with the aid of a small piece of silk, or else other precautions of a similar character are taken. In any case the trouble has lessened to such an extent that breakdowns of this kind are rare.

It is surprising to what extent corrosion of wire causes breakdowns in home-built receivers. It used to be a trouble in factory-built receivers, but now, fortunately, this phase has passed, due to the adoption of a proper technique in soldering. If only amateurs would be as careful, half of the work of our query department would disappear!

The main trouble is the use or misuse of soldering pastes and fluids. And this, in turn, arises from fruitless endeavours to solder joints which are not clean, with irons which are not hot enough. I have watched the procedure in so many

cases that I can tell you just what happens in nine cases out of ten.

The iron is heated and not cleaned. A stick of solder is applied and a drop runs off on to the table. Nothing adheres to the iron. It is now dipped into some soldering paste, it sizzles and another attempt is made to tin the end. Some solder sticks.

The iron, now slightly cooled off, is applied to the joint but nothing sticks here. It is reheated and applied once more to the joint, which by now is surrounded with a dirty mess of flux. More sizzling and spitting, some solder runs on, and finally a joint is made.

With something suspiciously like a sigh of relief the constructor passes to the next joint and repeats the routine. When the set is finished it works satisfactorily for the time being, and then, in a week, or perhaps a month, it "goes off" and there is no end of trouble to find the cause of the breakdown.

Finally it is traced to one or more corroded joints, perhaps at a valve holder where the corrosion has crept right underneath and affected the spring sockets themselves.

Soldering fluxes, rightly used and properly understood, can be boons and blessings, but in far too many cases they are expected to do impossibilities. A soldered joint can only be made if the two metal surfaces are free from oxidation, and if the solder actually comes into molecular contact with the two surfaces.

A good flux, heated sufficiently, will dissolve the surface oxidation, but will not remove dirt, so start with good clean surfaces or you will get nowhere.

Tinning a surface is performed by first of all heating and cleaning the iron, touching it with a good flux so as to remove the surface oxidation and allow the solder to run on to it

smoothly, and then applying the still thoroughly hot iron, with solder on it, to a clean surface which itself has a tiny smear of flux on it.

The heated flux dissolves the thin film of oxide (so thin as to be invisible) and the solder runs on to the metal and forms a silvery surface in perfect contact with it. Actually, one metal dissolves into the surface of the other. The two tinned surfaces can now easily be joined by a further tiny blob of solder which will melt equally into both. That is a proper joint.

In case you do not know it, the reason for properly tinning the iron is twofold. Unless it is tinned it will not carry the solder, and without proper contact it cannot satisfactorily transfer the heat.

Vitally Concerned

The whole business world is vitally concerned with soldered joints, for every telephone exchange has millions of them. It is significant that the Post Office will not allow the use of any flux but pure resin, which does what is required of it in dissolving away the surface oxidation, without leaving any corrosive material behind.

If some of the resin runs on to surrounding wires no harm will be done—it will simply set and form a glassy and highly insulating covering.

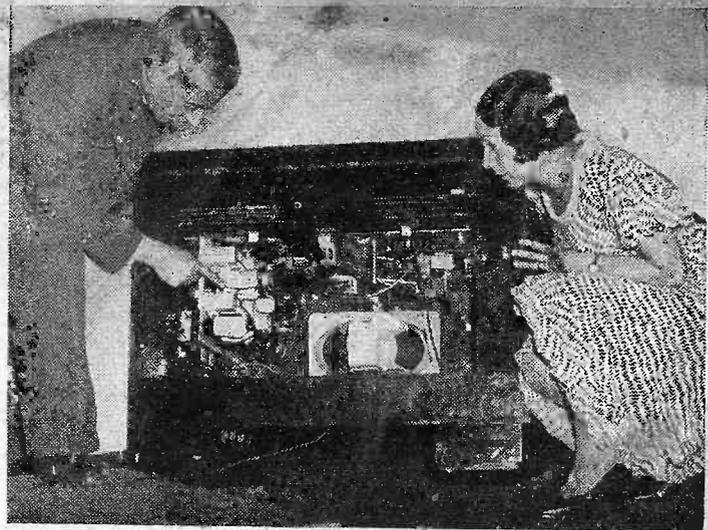
Many, *but not all*, soldering pastes are quite unsuitable for wireless constructional work. They may be non-corrosive when cold and unused, but the heat of the soldering iron decomposes some of them, liberating acids which have a rapidly corrosive effect on copper and brass.

"Killed spirits"—beloved of the travelling tinker—will do no harm in a kettle which is washed before use, or on much of the tinwork with which he deals, but it is much too dangerous for home-constructed sets.

The curse of some of these liquids and pastes is that they make soldering so much easier that the user is liable to overlook future trouble and hopes for the best.

A frequent cause of trouble is the use of soldering lugs screwed under nuts. The lug is tinned *in situ* and the wire affixed with a hot iron, making a satisfactory soldered joint so far as that goes, but often an unsatisfactory connection because the flux has run underneath the nut and between it and the soldering lug.

It is much better to tin the lug off the nut so as to avoid this trouble.



H.M.V. photo

In commercial sets great importance is attached to correct soldering —to avoid as much after-sales service as possible

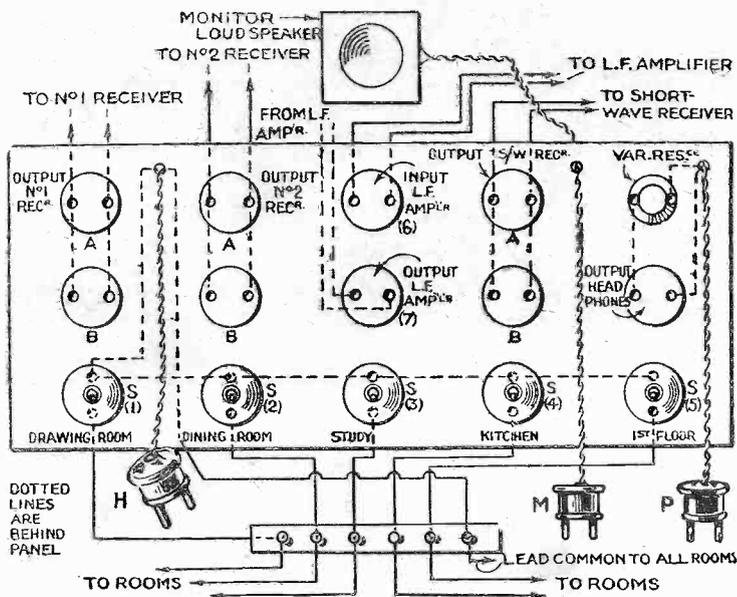


Coscor photo

In modern coil-winding shops precautions are taken against perspiration from the operator's hands

My "Radio Exchange"

By JAY COOTE



Distribution board used by Jay Coote in his wireless den—linking a number of sets with loud-speakers all over the house

FROM the outset, when I decided that wireless was a worth-while hobby, I made up my mind that some day I would possess a room equipped as a workshop; it was to be considered my den and, as such, free from the incursions of the "tidying-up" members of the household.

If in your own house you have only one receiver, there is no reason why it should not be installed in the principal living-room, but this will mean that you will be seldom allowed to use it as and when you want it.

Every set-owner knows that the same programme will not please all the household, and when he wants to search for stations he will be compelled by the powers that be—or, to put it more correctly, the power that is—to hang on to the local programme for some item in which he is probably not interested.

Only A Loud-speaker

From the day I moved into my wireless den, all wires, accumulators, batteries, and the sundry gadgets which we are told always "litter up the place," disappeared from sight in the rest of the house, and a loud-speaker alone was placed in whichever room it was proposed to listen to the broadcasts.

The problems with which I was faced were the following: (1) Arrange matters in such a way that I could listen to a programme in my own den; test a newly constructed set, or amuse myself with a short-wave receiver, whilst the family in another room could enjoy the local broadcast. (2) Listening was to be made possible in several rooms, and as a further recommendation I was told that the kitchen staff should be allowed to tap the entertainment if and when they so desired.

In Three Stages

The necessary work was accomplished in three stages. Firstly, flat cab-tyre twin cable was run under the carpets from the wireless den to each room where a loud-speaker point was desired; at that end it was connected to an ordinary bakelite electric-light socket, fixed at some out-of-the-way but easily get-at-able corner.

For the first floor it was found easier to take one twin cable through a window in the wireless den, run it up the back of the house

and so to a landing on which the bedrooms opened, and thence to them individually.

Sockets were placed at various points, the cable being carried on to the last one, all points being wired in parallel. The kitchen was given its own cable in the same way. (Note.—If several loud speakers are used they should be matched.)

At this stage of the proceedings, care was taken to label the end of each cable which reached the wireless den. The planning out of the workshop part need not here be detailed with the exception that a few words might be said about the aerial, earth, and electrical equipment.

In the matter of outside aerials, two were erected—one (horizontal) roughly 25 ft. long, another (vertical) which with direct lead-in measured about 45 ft; in addition, a well-insulated indoor aerial (12 ft. long) was installed in the den.

The three aerial leads were brought to their respective terminals (on an ebonite block) within close proximity to a bench on which it was proposed to place the receivers. Three earths were also obtained, namely (1) a main water pipe, (2) outside earth, by heavy cable and buried coppered plate, and (3) counterpoise, parallel with horizontal outside aerial. Here again the three earth leads were taken to an insulated panel with numbered terminals.

The bench destined to the receivers possessed in its lower half a shelf on which accumulators, high-tension batteries and a mains unit were placed, in addition to a mains low-frequency amplifier. The leads were brought to a rail fitted with the necessary terminals to which the sets could be connected. This method, except for the receivers, kept the bench clear.

As electric current was needed for lighting purposes, heating a soldering iron, feeding a moving-coil loud-speaker and mains receivers, a cable was run around the room, with electric-light switch sockets at intervals. From these current could be obtained whenever and where required.

In parenthesis, it should be mentioned that it is wise to place sub-fuses in each lead of the electrical supply, in case of an accidental short; it protects the house installation and if the fuse blows in the den, other rooms are not affected.

Provision was made for three receivers—namely, one for general programme purposes, another which might be in a perpetual state of "flux" for testing circuits, and a short-wave set. By the methods adopted, either battery or mains-fed receivers could be used, and three separate aerials and earths were made interchangeable.

So far, the wireless den remained a self-contained unit, but means had to be devised to pass any programme to any room, without interfering with experimental work or short-wave listening. A distributing panel, of

which a sketch is given herewith, was planned for this purpose, and does not require much explanation. A suitable five-ply board was taken and drilled to take the various sockets and switches illustrated; they can be bought at from 6d. to 9d. each from most stores and will be found perfectly suitable. The board itself acts as the connecting link not only between units in the den, but also between the den and the rest of the house.

For Output Only

It will be seen that provision has been made for receivers (1) and (2) and a short-wave set. With the exception of socket No. 6 (input amplifier) all are for output only. The panel plug marked "H" is the connection between the distribution board and the house installation; it can be connected to any socket (except No. 6) and, of course, the headphone side of panel.

The monitor plug is the terminal of the loud-speaker in the den, and in the same way can be used in all the sockets mentioned. Observe that in order to permit simultaneous reception in den and other rooms in house, these output sockets have been duplicated. If preferred, this can be avoided by using two or three-way plug adaptors.

As will be seen, on the right of the board is one output socket, and immediately above a variable resistance connected to another lead and plug marked "P."

As the 'phone plug marked "P" possesses a variable resistance in one lead which is in series with the 'phone output socket it is possible to tap by this means the signals of No. 1 and No. 2 sets or the short-wave receiver (even if latter's output is amplified) whilst still using the monitor loud-speaker or any other house loud-speaker connected through the distribution board. (The best place for the monitor loud-speaker is above the distribution panel.)

Leads of headphones are fitted with plugs, and as two output sockets can be placed in parallel, or if a three-way adaptor is inserted, two or more headphones can be used—a useful method when working with the short-wave set.

Short-wave Magnification

Lastly, the distribution panel also bears two sockets marked respectively "input" and "output" of amplifier. This addition was made later when it was found necessary to magnify weak signals picked up on the short-wave receiver. A mains-fed low-frequency amplifier can be utilised for several purposes and has obviated the necessity of adding a magnifying circuit to any hook-up with which experiments are being carried out.

A two-stage low-frequency amplifier (pentode output) was built on the bench shelf below the receivers. By this means a short-wave receiver consisting of, say, one high-frequency and detector stage can be fed through the amplifier of which the input leads are taken to the input socket No. 6, the output of amplifier going to panel output socket No. 7.

If plug "H" is then inserted the magnified signals can be passed on through the individual switches to any room to which an extension has been made; in the same way the monitor loud-speaker and/or headphones can be used.

The mains amplifier is also used in connection with a pick-up for the electrical reproduction

Continued on page 680

Coil Making Made Easy

By PETER SHIPLEY



Our workshop was recently the scene of an interesting coil-winding job—when "The Experimenters" arrived to make their Droitwich suppressor, as described in our preceding issue

NO one can call himself a real wireless amateur until he has wound a tuning coil. There is something remarkably fascinating about coil winding—much more of a pleasure than a penance, I assure you.

My own record of coil winding goes back to the days when we used to need gigantic affairs about 2 ft. long and 6 in. in diameter to tune to 3,500 metres for the Nauen time signals from Germany.

No Parallel Capacity

For some extraordinary reason, we never thought of using a parallel capacity with a much smaller coil. Perhaps it was that with our humble crystal detectors we wanted to produce the highest L-to-c ratio in order to build up at least an audible signal in the trusty Brown "A" phones.

Anyway, you don't want my reminiscences, do you? If you want anything from me it is to know what my rather cumbersome-looking wash-mangle affair is all about.

Coils, Chokes and Resistances

I'll tell you. It's for winding coils. And jolly good coils at that. Also it will wind—or allow you to wind with the minimum of effort—such things as high-frequency chokes and wire-wound resistances.

In fact, it will help wind anything that has an unconscionable number of turns to be laid down side by side in solenoidal form.

The coil winder shown by my drawing can be used for any of the coils that may be wanted

in your experimental hook-ups. The dimensions of the whole gadget are such that it will take

coil formers up to about 5 in. in diameter length. Very few coils to-day are any longer than that—very different from the old days I nearly wrote the whole article about just now.

Scrap wood is all you need for this winder. The bottom piece for the base ought to be fairly stout stuff—but the rest of it consists of lath wood such as most of you will have knocking about the house.

On the Slant

The bearings to take the winding spindle are cut in the two uprights on the slant, so that the spindle during rotation will not ride out.

The reel of wire "ghosted" at the back on the little upright spindle can be held in check as it unwinds by putting a spring washer and a couple of nuts above it on top of the reel.

The action of the gadget is quite easy to follow, as I expect you already realise.

The wire end from the reel supported on the spindle in the background is first threaded underneath the screw eye and from that point wanders up to the beginning of the coil former on the centre spindle.

The winder thus being loaded, you can proceed merrily with your coil winding by slowly turning the winder on the right with

the right hand, while at the same time you feed up the wire from the hook with your thumb and first finger of the left hand.

One rather important point I haven't yet mentioned—you must count the turns as you perform your two-fisted act. See that you do the job alone—or some fool will be sure to interrupt you just as you have counted up to three figures.

The winder itself is quite cunning—but you need not follow the specification implicitly. I have filed the end of the screwed spindle square, and cut out a small hole in the brass strip of the handle just big enough to be a tight fit when pushed over the squared end.

The winder can be an old piece of tubing if you don't happen to have an actual winder handy.

Cutting With Fretsaw

The "grip" for the coil former is made up by cutting suitable lengths of the wood lath with a fretsaw. At least, that is how I did the job. You may know a better way.

You need two pieces of wood at each end of the coil former. The inner pieces are shaped so that they just fit snugly inside the coil former—different sizes being cut up ready for all the diameters of coil former you think you are likely to use.

The outer pieces of wood are for clamping the coil former between them—these being a little wider than the diameter of the coil formers themselves.

Wing nuts on the outside of these outer pieces of clamping wood can then be tightened up so that the coil former really is quite firmly gripped on the main spindle.

For the spindle you can use either brass strip or steel—brass perhaps being the most common among wireless amateurs.

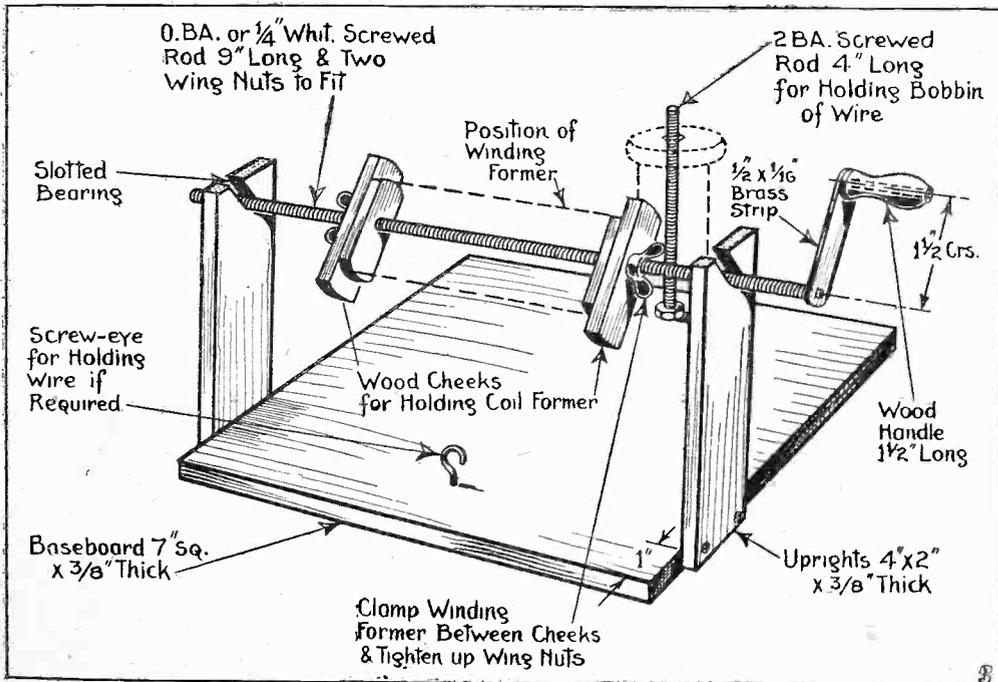
As I show by the drawing, the size of rod to obtain for this job is either O.B.A. or 1/4-in. Whitworth, this being 9 in. long overall, with wing nuts as specified.

Why This Trouble?

You may possibly wonder why we should go to all this trouble to make a winder for such a simple job as winding a few turns on a plain coil former.

I say you may wonder—but only if you have never wound a coil of any kind. Actually the seemingly so simple job of laying on turns neatly one after the other is fraught with little difficulties, especially when done by yourself.

With the aid of the winder the tension on the wire can easily be adjusted, while the actual rotation of the coil former in the clamping device makes the job of winding child's play. Perhaps I can anticipate your ribaldry by saying that is why I can do it so easily now and how!



This drawing gives all the practical details you need to make a highly effective coil winder from odd scraps of wood and metal that can be dug out of the old junk box



Meet Mr. Wells Coates (on the left), the well-known designer, who was responsible for the circular bakelite cabinet of the Ekco universal mains set. With Mr. Coates is E. J. Wyborn, the radio engineer at Ekco's responsible for the "works" of this set

Crusaders Air Their Views

a majority desire must exist among readers.

We know of no other way of finding out what this desire is—except by the letters received. And that is the way, after careful analysis, we shall produce the next design.

Of course, it will not appeal to everyone. That on the face of things is utterly impossible. But it should come as a welcome design to many, perhaps most, of our readers.

Here is just a typical letter that expresses the thoughts we ourselves have in mind. "I hope your new Crusader set for January 23 will be a battery-driven four-valve super-het—using the latest and most up-

to-date valves, of course. as much against it as for it—but with the development of the latest types of valves it is, as far as we can see, all gain and no loss to incorporate some one or other of the several well-tryed and tested systems of controlling the high-frequency amplification of the intermediate valves.

After all, the field strength of many of the foreigners is now so very high that, even at the point of maximum fade, there is not what there used to be—a complete fade-out. We can, with suitable amplification, expect to keep the continuity of many foreigners and more than that to keep them at level output volume.

This has made it possible to envisage sets that will give definite programme value from foreigners—a boon that would have seemed utterly impossible of realisation say two or three years ago.

Even now, of course, we cannot expect to hear such good-quality signals from abroad as from the high-power local, simply because the field strength, though good, is not good enough—and probably never will be under the present system of transmission.

In Line With Locals

But who can say that we have reached the limit of "enjoyability" of the foreigners? Many more inventions are waiting round the corner to bring the foreigners in line with the locals as regards quality.

What self-adjusting volume control systems are doing to-day for keeping the signals level some other system may even now be developing to give us good quality—by which we mean a wide frequency response without background.

There's a problem worthy of the best efforts of the Crusade. Can you, dear Crusader, design a super-het that will cut out all the background as well as retain as wide a low-frequency response as is practicable for the local high field strength signals?

One other point. Some Crusaders are pining for a super-het that will be A.C. operated. Perhaps the best thing we can do is to bring out a battery version and then to think out ways and means of working this from A.C.

ANOTHER batch of letters has arrived demanding that the short waves shall be given a show in the next Crusader set. It might be possible—but there again we imagine at this stage that to include the short waves would put a great many ordinary listeners off the design.

After all, if you are on the look-out for a good broadcast set design it takes a deal of argument to persuade you that the only thing for you is an all-wave set. Because, manifestly, a combination set must be a compromise at some point—and the keen broadcast fan is going to seek out the weak point of the all-wave set from the start.

It is rather difficult, really. We want to please you all, and yet, as with the august B.B.C. itself, that is impossible right from the start. We must therefore aim to interpret the will of the majority—realising at the same time that if we think always of an Average Listener we shall appeal to no one—because it is probable that the fan exhibiting an average number of wants as deduced from the vast and variegated number received *simply does not exist!*

The Real Reader

In other words, we must beware of synthesising a purely illusory constructor—and keep right down to what must be the real reader of this paper.

Everything at the moment seems to be pointing, as a matter of fact, towards the production of a four-valve super-het for the next Crusader set. This is because such a set will meet the consensus of opinion as expressed in the hundreds of letters received by us during the past few weeks from keen Crusaders.

Only by sorting out these letters and comparing the "wants" as expressed within them is it possible to gain an idea of what the bulk of home constructors want.

Although we have expressed a fear that possibly in doing this we may synthesise an imaginary constructor, there is no doubt that

to-date valves, of course.

What I should like would be a set using double-diode-triode as second detector and QP21 double-pentode output valve. The anode current in terms of milliamperes must not be too great.

"The super-het I have in mind *must have self-adjusting volume control.*"

Design Taking Shape

This comes from CC1383, who has a very good idea of what he wants—and evidently intends to get it. We hope that this Crusader from Brockenhurst, Hampshire, will be suitably pleased with the design that is taking shape in our laboratories at the present time.

Assuredly the public is becoming much more educated as to the need for self-adjusting volume control. At one time there seemed to be quite a lot of suspicion as to the merits of this system.

It was, in the beginning, a system that had

Microphone Manipulation—Continued from page 674

Both the battery for the microphone and the indicating lamp are of the Ever Ready type

PARTS NEEDED FOR MICROPHONE CONTROL BOX

- BASEBOARD**
1—Five-ply 8½ in. by 6½ in.
- BATTERIES**
2—Ever Ready 4.5-volt type.
- CABINET**
1—Aluminium to specification.
- INDICATOR LAMP**
1—Bulgin, type D.9.
- JACKS, ETC.**
2—Bulgin, type J.2.
2—Bulgin plugs, type P.15.
- RESISTANCE, VARIABLE**
1—Bulgin, 1,000-ohm, type VC24.
- SUNDRIES**
Connecting wire and sleeving (Goltone).
1 ft. thin flex (Goltone).
Aluminium, 9½ in. by 1 in.
- TRANSFORMER, LOW-FREQUENCY**
1—Ferranti, type RD124 (ratio, 25 : 1).

126. The on-off switch is a two-pole make-and-break toggle type while the plugs and jacks can be of any type you wish although we suggest you obtain open circuit type.

The volume control is a 1,000-ohm potentiometer but you only use two connections—the centre and one side. You can probably make the aluminium can yourself, otherwise you can buy it from Peto-Scott's. It is 9 in. wide by 7 in. deep by 6 in. high and this is provided with a tight-fitting lid.



London and Provincial Factors microphone

On Your Wavelength

The Week's Radio Gossip :: By THERMION

Breakfast Programmes

THERE seems to be quite an agitation just now for broadcasts at breakfast time. The B.B.C., I hear, is considering the matter, and it seems likely that something may come of it.

Myself, keen listener though I am, I don't feel any burning desire for broadcast physical jerks before I enter my morning tub or for light music during the subsequent consumption of the breakfast kidney.

After all, if you want early morning broadcasting you can generally get it from abroad with anything like a set. And I wonder just how many *do* want it?

I should say that it would be a far, far better thing to spend available money on improving programmes of present length than spend it on lengthening them out.

In the States

IN the United States they start the day a good deal earlier than we do. One of the first shocks, in fact, that a visitor to America receives is when business people give him appointments at their offices at half-past eight in the morning. Americans, too, never seem to have quite enough of the broadcast programmes.

Many of the big stations, such as WLW, start up at six o'clock in the morning and run without a break until two o'clock the following morning—twenty hours of the twenty-four.

And there is even more in it than that. So vast is the United States that there is three hours difference in time between the Eastern and Western parts of the country.

Thus, when the New York stations close down at two o'clock in the morning those in the central parts have still an hour to go, those in the Mountain States two hours, and those in the Pacific States, such as California, three hours. If you like, therefore, you can continue your listening until five o'clock the next morning, when there is only a gap of

one hour until your home station starts again.

Reversed Droitwich Effect

LAST week I described how a Bournemouth reader heard the London Regional as a background to Droitwich during the latter's programme intervals. This is just the opposite of the ordinary Luxembourg or Droitwich effect, in which a long-wave station is heard as a background to one on the medium waves, the two being more or less in a straight line with the receiving aerial.

Since then I have had reports from several other readers that they have heard medium-wave stations, including the North Regional, when the set was tuned to long-wave stations. There is no question of break-through. In every case the programme was received perfectly clearly, and the spread of the station was small.

I believe that most of these queer cases are due to beats between the oscillator frequency *plus* the intermediate frequency of superhets with the frequency of a medium-wave station which gate-crashes in this way.

In every case reported to me so far, reception has been done with a superhet, and all kinds of queer effects can happen through different frequencies beating with one another.

New Midland Regional

THE present Midland Regional station, which began life as 5GB, is by far the oldest of the medium-powered B.B.C. stations now in existence. Certain alterations have been made from time to time, but the whole plant is now thoroughly antiquated. It is surprising how rapidly things become prehistoric in wireless!

Work on the new Midland Regional is proceeding rapidly and it is quite likely that test transmissions outside programme hours will be heard from the medium-waver at Droitwich before the end of January.

If everything goes according to plan, it should take over the full programme service in February. It should be a fine, fat signal over the whole of the Midlands and, owing to its central position, I expect that it will be receivable in nearly every part of England and Wales.

Wavelength Reshuffle?

SOME time ago I referred to the ridiculous rumours that the B.B.C. was going to alter the wavelengths of many of its stations.



Joe Loss, the popular dance-band leader, compares the scores of his latest record with its reproduction on a Cosser radio-gramophone

These were accompanied—and they always are—by further rumours that all existing sets would soon be out of date.

Of course, no such thing will happen. Certain re-distributions of the wavelengths allotted to the B.B.C. may take place; it is, in fact, likely that the Midland Regional will swap with the Scottish National or some other British station.

But you need have no fear at all that your present set, or the new one that you think of buying, won't be up to the task that it is called upon to perform.

I don't know who starts these pernicious rumours, but whoever it is ought to be hanged from his own aerial mast.

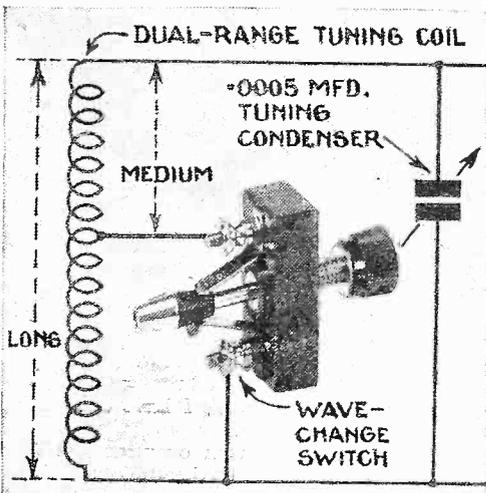
Boom Year

SOME of our big firms are simply overwhelmed with orders for receiving sets just now, and it is not only the domestic receiver; the car radio set is positively leaping into popularity.

The firm of Ekco has builders working day and night to extend their car radio factory. They find that there is a kind of snowball effect. Every car radio set they sell brings in two or three new orders.

I am not surprised, for if ever you have done a long journey in a car equipped with wireless you will realise what a huge boon it is.

I differ from a good many people in that I don't want the car wireless set running all the time as I drive along. If I am doing a longish trip I like to stop for a brief rest



In simple tuning circuits the medium waves are tuned on the smaller winding by the parallel condenser, the switch shorting out the larger portion. When long waves are tuned the two-point switch is out of circuit and both windings are then in series, the condenser being in parallel with them. It is incorrect to refer to the larger winding as the long-wave winding, because actually this is made up of both windings.

"A.W." Reference Sheet—No. 13

The Low-tension Accumulator

THE usual 2-volt cell, used for heating the filaments of battery valves, is formed of three elements. Two of these take the form of plates built up from different materials, while the third is a weak acid solution. The number and size of plates depend upon the ampere-hour capacity of the cell.

A common arrangement is four positive and five negative, each group being so made that they interleave with the other without touching, the whole is then immersed in the acid solution.

The solution or electrolyte, as it is called, is sulphuric acid diluted with distilled water until its specific gravity is 1.25. The positive plates are formed from lead peroxide and have a chocolate brown colour, while the negatives are made from spongy lead and retain their natural grey colour.

If the cell is in a good and charged condition, these colours will appear clean and fresh, but if the cell is in a poor or run-down condition the plates will appear dull. The electrolyte should always cover the plates, pure distilled water being used for this purpose. Terminals should be inspected from time to time and smeared with a trace of vaseline to protect them from acid.

When the ampere-hour rating is quoted

as "intermittent" it should be remembered that this is equal to only one half of the "actual" capacity. The usual charging rate is one tenth of the cell's actual capacity, but a lower charge for a longer period is always advisable.

The maximum voltage is 2.2 per cell, and it should never be allowed to go below 1.8 volts. The best way to determine the condition is by means of a hydrometer which measures the specific gravity of the acid. If the reading is below 1.25 it will indicate that the cell is below normal.

When two or more cells are connected in parallel the voltage will be the same as one, but the ampere-hour capacity will be equal to the sum of the individual cells added together. If they are connected in series the voltage will be equal to the sum of the voltages while the capacity will not be increased.

To determine the useful life of a charge, assuming the cell to be in perfect condition, the ampere-hour capacity should be divided by the total current required by the filaments of the valves.

If a cell is charged or discharged at a rate above that specified by the maker, sulphuration is likely to take place which, if not attended to, will rapidly shorten the life of the cell.

every two or three hours, and then it's a real joy to be able just to turn a switch and bring in broadcasting.

Thorough Tests for Sets

IN the past I have had a good deal to say about the too great liability of some British sets to break down when they have been in use for a week or two. In the dog fight for trade, manufacturers here and there have cut overhead costs to the bone, and in doing so certain of them have tried to save expense by economising on the test department.

This is a fatal policy, and I am glad to hear from the firm of Cossor that their new receiver goes through no fewer than forty-one different tests before it is delivered to the customer.

Thorough testing is particularly important in so complicated an instrument as even the smallest of superhets. And it is essential that all components should undergo exacting trials under real working conditions before they are passed out for use.

Cossor's realise this, and I award them one of my own particular pats on the back therefor.

Folly of Scamping Tests

CERTAIN firms have come to realise by bitter experience how foolish it is to scamp tests of components. Some years ago there appeared on the market a receiving set whose performance was magnificent—for a time. It was not until thousands had been sold that it was realised that there was a big, bad snag.

The output of the set was something like 2½ watts; the speech-coil of the loud-speaker used was utterly inadequate for anything of the kind. It just fluffed out when it had been in use for a time and the losses in free servicing were gigantic.

More recently, another instance of the un wisdom of taking components for granted occurred. In one set of first-rate design, certain resistances were used.

These were of the wire-wound type and the grooves containing the windings were too

My "Radio Exchange"—Continued from page 676

of gramophone records, room for a universal turntable having been found close to it, on the shelf below the bench.

It was not a difficult matter to add a microphone and two-way switch to permit announcements for either broadcast transmissions or gramophone records. Earth screened cable was used for these connections and they were made as short as possible. The wiring of the switches is an easy matter; simply connect one side to a common lead connected to one lead of the panel plug (H), the other side of each switch to be taken to one end of its respective room cable.

The free ends of these cables are taken and joined to the second lead of panel plug (H).

As there existed a possibility that some alteration might be desirable in the extension leads to the house a duplicate terminal block was installed below the board; any fault in any section can be traced from that point and thus obviates an examination of the back of the panel, which in my case has been fixed to the wall.

Finally, a few words in respect to the wiring of the distribution panel. Wherever possible, leads were kept well apart, and in many instances screened cable was used, each length being earthed. Connections from the receivers to their respective output sockets on the panel were made with cab-tyre rubber-covered leads and these were carefully placed at the greatest distance possible from those carrying electric-light current.

All sockets relating to high voltage to prevent any possible mistake were enamelled red. Where mains sockets are used for, say, heating a soldering iron, supplying current to a moving-coil loud-speaker, or feeding a wireless receiver, they have been of the combined switch variety, thus allowing, by means of a con-

close together. After the sets had been placed on the market it was found that "arcing-over" took place, and a big proportion broke down owing to this fault within a short time.

I could give heaps of other instances, and one hopes that manufacturers who have been once bitten will be twice shy of using components that have not been thoroughly tested.

Interference Problem

THE report of our own committee on man-made interference is still awaited with interest, particularly by those listeners whose reception is punctuated at certain periods of the day by crackles, fizzes, thumps, whacks, and whatnot, due to radiation by a variety of electrical appliances.

Meantime, in the United States, a committee has also been set up, though it seems likely that it will be called upon to hustle rather more than ours. The American committee, with Dr. Alfred Goldsmith as its chairman, has been appointed not by the Government, but by the Institute of Radio Engineers in partnership with the Radio Manufacturers' Association.

It proposes to attack the problem at its source (and that is generally the right place) by getting manufacturers of electrical apparatus to turn out appliances of a non-radiating kind.

Judging by some of the samples of domestic appliances that I have seen lately, some, at any rate, of the makers in this country don't care two hoots (or two crackles) whether they radiate or not; nor, quaintly enough, does the purchaser, though since he must have electric light in his house, the odds are that he has also a wireless set.

If the public would refuse to buy appliances that do radiate, manufacturers would be brought to their senses more quickly and more certainly than any old committee could do the trick.

necter, a small 5-watt red bulb to be inserted.

This light on many occasions has prevented the current being left on all night. It is an easy matter to switch off a set and to forget an independent mains-fed loud-speaker or soldering iron.

It was feared at first that interference might exist between leads on the distribution panel, but such has not been the case. If "H" plug leads to switches and board sockets, as well as house cables to switches are kept well apart, and if screened wire is earthed, no trouble arises between two circuits.

Output of No. 1 receiver can be passed through the distributing board to one outside room, and another broadcast from No. 2 to, say, the kitchen, whilst signals from the short-wave set, duly amplified, can be simultaneously received on the loudspeaker in the den or on headphones without the background of any other programme passing through the wall panel.

Moreover, the change-over of one radio entertainment to another is an easy matter by means of the connecting plugs. On many evenings, whilst the local broadcast is being enjoyed by the household, I have been using the short-wave receiver.

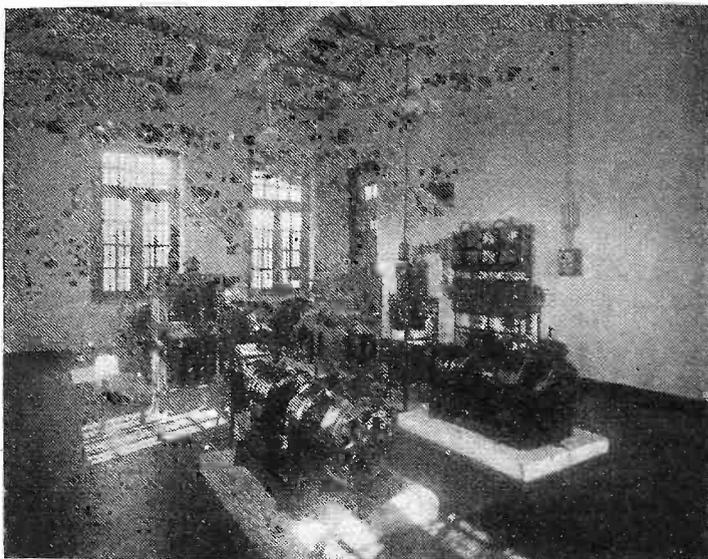
When a broadcast from overseas has been captured and tuned-in on headphones, it has been put through the amplifier and after announcement through the mike by means of the "H" plug, it has been fed to loudspeakers in other rooms.

At the same time the local programme, duly damped down, has been held in the den for use when again required.

The equipment of the wireless den and workshop, and the construction of the distributing panel, has afforded much pleasure and, as devised, the total cost was very reasonable.

Listen to India on Short Waves

India is much in the news at the moment and these pictures of VUB, Bombay (published by courtesy of the station director, Mr. C. Sethna) are of more than usual interest. This station can sometimes be heard on 31.36 metres.



Engine room of VUB transmitter. Note the large ceiling fans



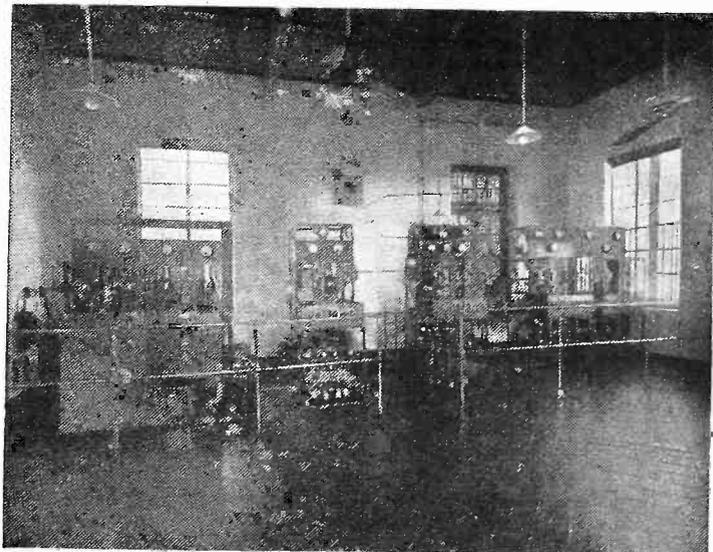
Members of the Indian staff in the control room at Irwin House



A view of the transmitting station with its T-type aerial



South corner of the main studio in Irwin House

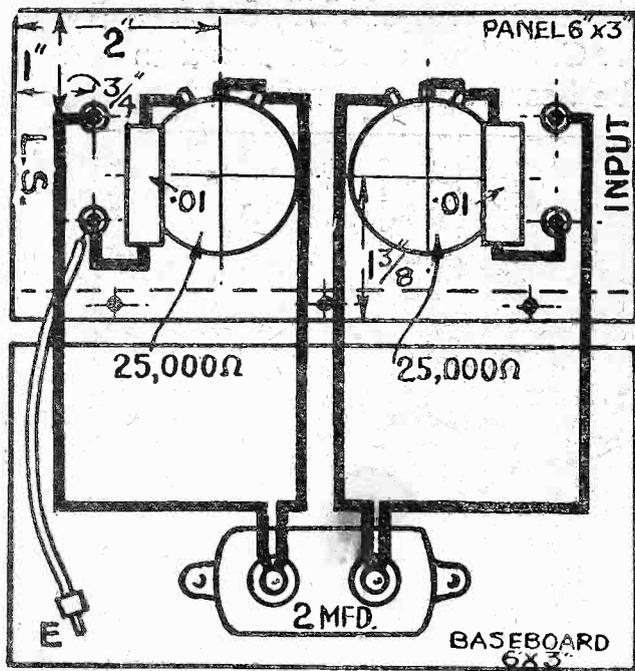


A view of the transmitting gear, which seems to be quite ambitious. Have you ever heard VUB?



Irwin House, Bombay, which houses the studio and control room of VUB. Quite as imposing as "B.H."!

CONTROLLING THE T



Layout at half-scale for the unit designed to give tone control with two loud-speakers

WHAT an extraordinary thing it is that so few sets have a tone control—even in these so-called enlightened days. We are referring, of course, to home-constructed sets.

Perhaps the truth is that tone control is looked upon as an "extra" whereas in reality it is almost essential to combat modern ether conditions.

What, you may ask, has tone control to do with ether conditions? Actually, everything.

The whole question of tone, or more broadly speaking, quality is wrapped up in ether congestion. Because, you see, ether congestion involves making the set more selective—and that means cutting down the quality.

Long Story

It is a long story to tell properly. This question of quality and selectivity, we mean. In brief, the highest form of quality of reproduction can be enjoyed only when conditions in the ether are excessively favourable.

When, that is to say, the field strength of the wanted signal greatly exceeds the field strength of the unwanted foreigners—or at any rate if they aren't foreigners they are adjacent to the wanted signal.

For reception of the more distant stations where there is almost always a background made up of high

frequencies, it is essential to lop off some of the top response of the low-frequency amplifier. Unless this is done there will be an annoying background all the time, due to the fact that the ratio of wanted to unwanted signals is not high enough to drown out the noise.

Take as an example the reception of Luxembourg, which is only separated from Kalundborg by 8 kilocycles. On most sets at night time there is a continuous high-pitched whistle around 5,000 cycles—due to heterodyning of the two stations.

There is really no need to endure this annoyance. You cannot stop the whistle on a straight set however much you increase selectivity by decreasing the input—unless you are prepared to sacrifice a good deal of the volume, of course.

So that the only thing left is to lop off the top response, as we said. This is where some kind of tone control is so very useful.

By lopping off all frequencies above say 4,500 cycles the whistle is cut out—for it occurs above that frequency—and, of course, there is no appreciable loss of volume such

On the other hand, for a purposely designed to cut cycles, and the only disadvantage is that you don't enjoy high-fidelity even on

So that if you have a set of frequencies—due to fairly flat low-frequency-amplifier design from the local-station point of view, but you must adopt means of cutting out the ground on the distant ones.

It is not really very difficult design to allow your tuning circuits to respond to a wider range of frequencies than you intend to reproduce. But it is better to waive this point and to provide a tone-control unit rather than to scrap the set and put up with the annoying background.

What we are trying to make clear is that a tone control as we know it is really not tone control at all—but a variable volume filter to cut off top frequencies under conditions render this tuning absolutely essential.

Lot of Talk

Well, well, that's a lot of talk about what you possibly consider is a simple point. Think it out, though, and you will agree that the matter is assuming a great importance as ether congestion grows.

Another point; this is nothing to do with tone control, actually, but it does affect the quality of the output. We refer to the question of output circuit for the loud-speaker.

You know as well as I do that if you want better quality you must use a larger output valve, meaning more high tension—consequently more an

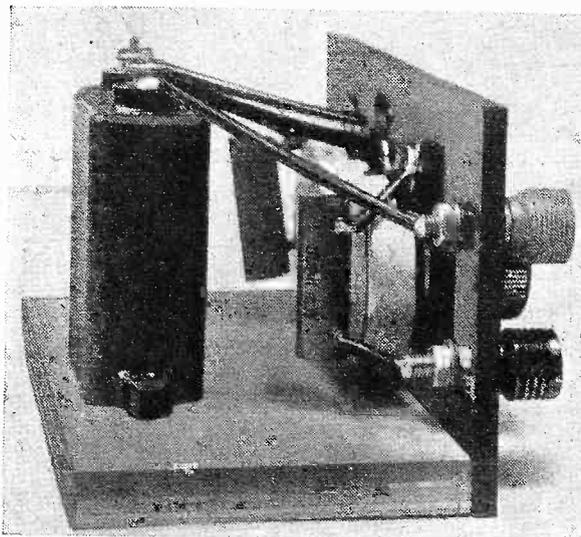
current. Balanced-armature speakers indeed any speaker with unprotected winding—will saturate. Even if this does happen the inductance must owing to the increase in current. That inductance fall affect the bass response in a way.

To overcome this trouble some kind of choke or transformer should be inserted in the output circuit, capable of handling increased current without loss of inductance. This calls for a large inductor in the loud-speaker itself.

Resistance. Will Also the resistance of such with heavy-gauge wire, will compared with anything from loud-speaker winding in, say, a speaker.

There is no need for us to worry about voltage to arrive at the actual value of the choke every time. These two ideas—the necessity for a proper output circuit—have been in our minds for some time; and we

By The Experimenters



From this view you can see how the fixed condensers of the dual-tone control unit are mounted actually on the potentiometer resistances

as you would experience by cutting out the whistle with a very highly selective circuit.

Let us make it quite clear that we don't regard this high-note cutting as a desirable thing in itself. We appreciate that the very high notes we are cutting out with our units are really wanted if complete realism is to be obtained from the reproduction.

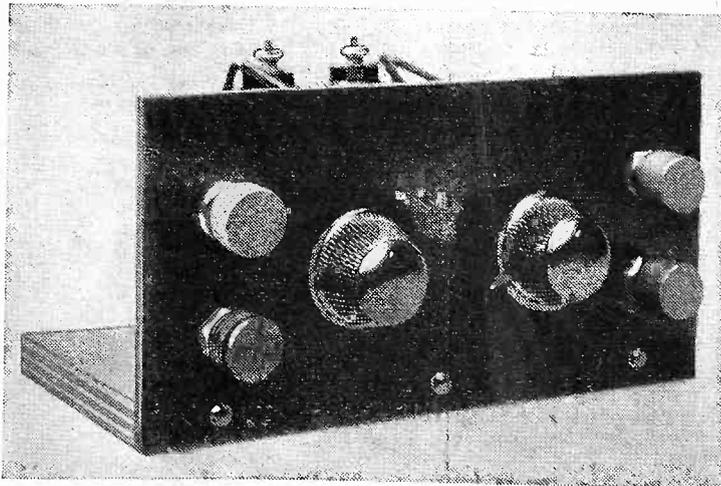
But, talking of realism, we must face facts. In the ether of to-day precious few stations can be received clear of heterodynes if the low-frequency response is really good—if it goes up to, say, 9,000 kilocycles.

That is why commercial sets including high-fidelity circuits often have a switch to cut out the high-frequency amplifying stages—in order to increase the audible-frequency response, without bringing in the whistles that the high-frequency stages would make audible in the high-fidelity position.

That is why commercial sets including high-fidelity circuits often have a switch to cut out the high-frequency amplifying stages—in order to increase the audible-frequency response, without bringing in the whistles that the high-frequency stages would make audible in the high-fidelity position.

PARTS NEEDED FOR DUAL-SPEAKER TONE CONTROL

- BASEBOARD**
1—Five-ply 6 in. by 3 in.
- CONDENSERS, FIXED**
2—Dubilier .01-microfarad, type tubular.
1—Dubilier 2-microfarad, type BB.
- PANEL**
1—Ebonite, 6 in. by 3 in.
- RESISTANCES, VARIABLE**
2—Erie, 25,000-ohm.
- SUNDRIES**
Connecting wire and sleeving (Goltone).
2 ft. thin flex (Goltone).
1—Clix wander plug, marked Earth.
- TERMINALS**
4—Clix, marked :L.S.—, L.S.+, L.S. (2).



Front view of unit for dual tone control, showing the terminals for the input loud-speaker on the left and for the second loud-speaker on the right. This is unit number one, please note!

ONE How to Make Two Simple Output Units

commercial use, sets are these days around 4,500 is that you can never wrong locals. ponding to fairly high fre- quency circuits and to good you are at an advantage

of units that may help to solve both problems at one fell swoop.

Take a look at the tone control and output unit. The circuit is carried over to page 692. The choke you see across the terminal marked positive and negative loud-speaker takes the place of the loud-speaker winding—these terminals being con-

nected to the loud-speaker terminals of the receiver.

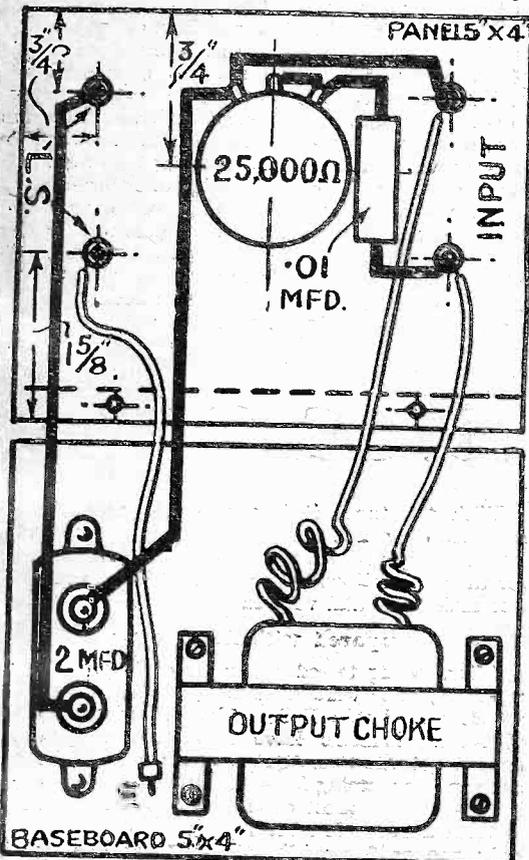
The choke will pass sixty to seventy milliamperes without turning a hair—and at the same time will keep up its inductance. The loud-speaker is now connected to the other two terminals on the unit, and in this way is completely isolated from the output valve as far as direct current is concerned by interposition of the 2-microfarad fixed condenser.

At the same time, this condenser passes the alternating or speech currents quite easily—and after all they are what actuate the loud-speaker winding.

Another good point is that one side of the loud-speaker will be at earth potential—and, if necessary, the loud-speaker can be used at a distance from the set. If you like, therefore, you can make use of a single-wire extension, with one side of the loud-speaker connected to the nearest earthed point—using the earth itself; in other words, as the connecting link for the return.

In this first unit the tone is controlled by a .01-microfarad fixed condenser in series with a 25,000-ohm variable resistance. The series network is then connected across the choke already referred to.

The effect of the resistance and condenser is to offer a by-pass for high frequencies that would normally go through the choke.



Half-scale layout of the tone control and choke-capacity output unit

PARTS NEEDED FOR TONE CONTROL AND CHOKE-OUTPUT UNIT

- BASEBOARD**
1—Five-ply, 5 in. by 4 in.
- CHOKE, LOW-FREQUENCY**
1—Savage, type CC 38M.
- CONDENSERS, FIXED**
1—Dubilier .01-microfarad, type tubular.
1—Dubilier 2-microfarad, type BB.
- PANEL**
1—Ebonite, 5 in. by 4 in.
- RESISTANCE, VARIABLE**
1—Erie, 25,000-ohm.
- SUNDRIES**
Connecting wire and sleeving (Goltone).
1—Clix wander plug, marked: Earth.
2 ft. thin flex (Goltone).
- TERMINALS**
4—Clix, marked: L.S.—, L.S.+, L.S. (2).

winding than is included

low, Too

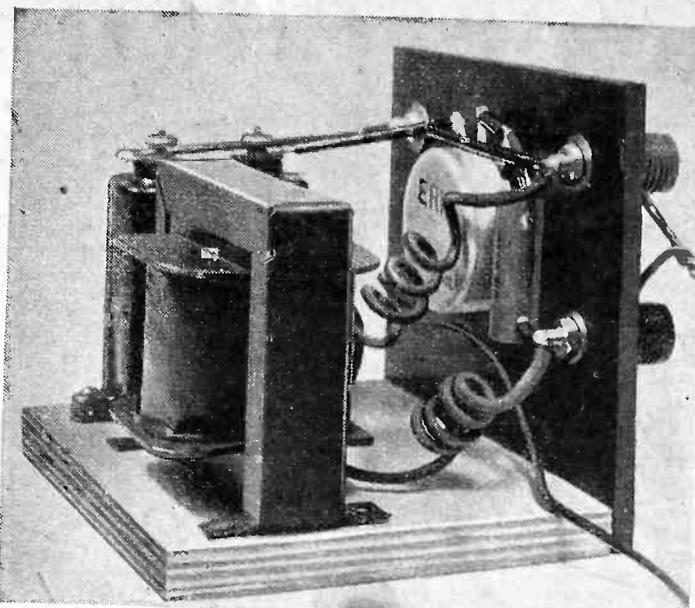
because it is wound say 250 ohms, as 2,000 ohms of a balanced-armature loud-

which will allow most of the output valve—

tone control and for a floating round in our now designed a couple

The actual amount of bypass is, of course, controlled by the value of the resistance, which you can adjust in reception.

Now we come to the second unit, which is a little more subtle. First of all, this is intended for use with sets that have some kind of output circuit already incorporated.



This is the output choke that will pass 60 to 70 milliamperes, "without turning a hair," as our contributors put it

The idea is to put in tone correction, and if desired use two loud-speakers with the minimum of trouble.

We know very well from experience that when you start to make use of the two terminals on a commercial set for the use of an external loud-speaker it very seldom gives a quality that is comparable with the internal loud-speaker.

Extension Loud-speaker Effects

Usually the extension loud-speaker is all "topy" due to bad matching. This second unit is designed to counteract this effect. The two terminals marked loud-speaker input in the circuit must be connected across the two terminals marked external loud-speaker on your commercial set, or across the loud-speaker terminals of your home-built set, providing it has transformer or choke-filter output.

If you have a moving-coil loud-speaker with integral transformer its primary will act as the choke, which in conjunction with the 2-microfarad condenser makes a complete output filter.

The top tone control is for the internal speaker and the lower one in the diagram works on the second or external loud-speaker.

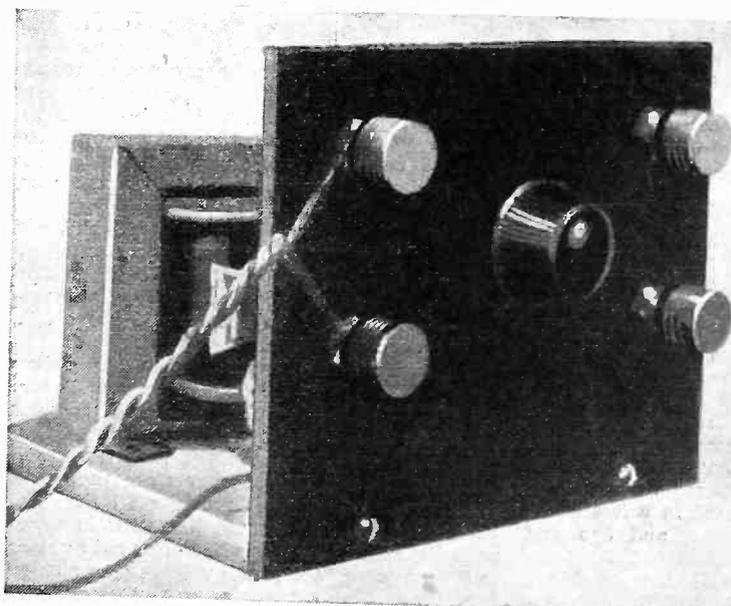
May we emphasise the point that, in this second unit, the choke or primary of the transformer integral with either the set or its associated loud-speaker acts as the choke of the externally-connected loud-speaker's filter.

In other words, the 2-microfarad condenser can only pass on the speech currents from the set if there is an impedance setting up this voltage in the anode circuit. That is why there must be a transformer or choke in the loud-speaker or set connected to the loud-speaker input terminals.

Those people who have a straight set with an open output circuit—no choke or transformer, that is—but want to use two loud-speakers, have two alternatives.

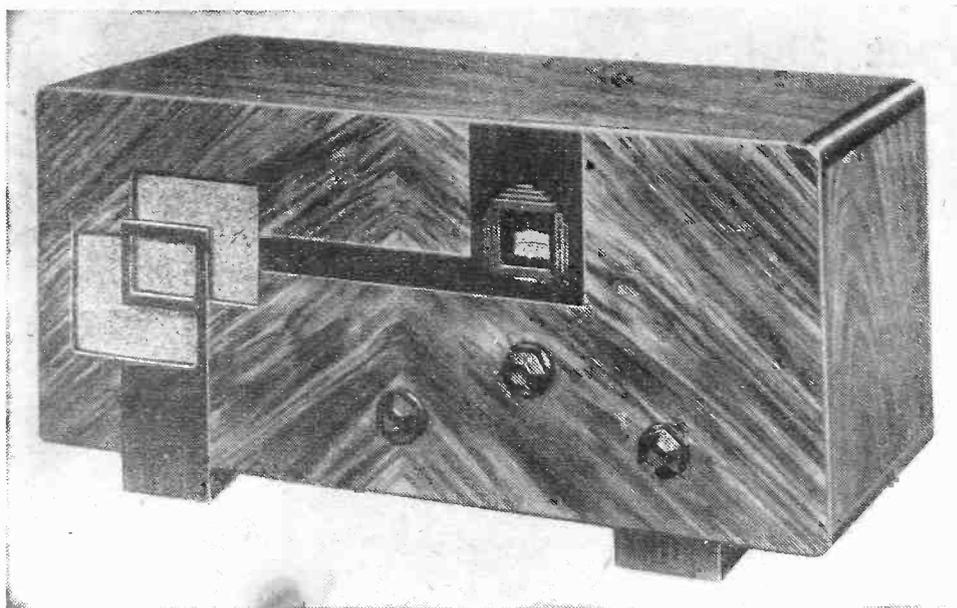
Firstly, connect across the loud-speaker input terminals a low-frequency choke. Any one will do with an inductance of over 25 henries when passing the current of the output valve.

Secondly, connect the



Front view of the choke-capacity and tone-control unit, showing set connections on the left and on the right the loud-speaker

Continued on page 692



Lissen D.C. Three

TO hear Zeesen clear of Droitwich is a feat some of the super-hets cannot perform. During our tests of the new Lissen 8043 D.C. Three, which is not supposed to have knife-edge selectivity, we were able to hear the programme from the German station with only fractional interference from Droitwich. We did, of course, have to use a short indoor aerial and the most selective aerial tapping, but even so we were very much impressed right from the very beginning.

Inexpensive Receiver

This Lissen receiver has been designed for D.C. users who require an inexpensive receiver that will bring in a moderate number of stations at good quality. If, of course, you live very close to the Regional station you will have to take every precaution in erecting your aerial, otherwise you will not obtain adequate selectivity, but all those thousands of readers who are over twenty miles from the Regional will be able to obtain very satisfactory results with almost any kind of aerial installation.

During our aerial tests, at a distance of thirty miles from the Regional, we used the second aerial tapping giving average selectivity with good volume. Unlike some of the highly complicated super-hets we had no need closely to examine the controls, for these are almost obvious.

Ingenious Arrangement

Take a look at the illustration of the receiver. On the left-hand side is the volume control. This is rather an ingenious arrangement, for in addition to controlling the voltage applied to the screen-grid valve after the high-frequency stage is giving maximum amplification, any further rotation of the control introduces a certain amount of reaction. In the centre is, of course, the tuner.

There is not any trimmer or additional control, so that once you have calibrated the tuning dial these calibrations remain set. This dial, by the way, is calibrated in wavelengths between 200 and 540 metres, and 850 and 2,000 metres, and is fully illuminated.

On the right-hand side is the combined wave-change and on-off switch. The different positions are engraved on the knob, so that you will have no difficulty in finding out just to which waveband the receiver is tuned.

We know you will like the cabinet design. We cannot say it is entirely original, but the construction is as good as we have seen on any receiver of this type this season. The wood is polished figured walnut relieved by dark overlays, while the tuning escutcheon, which is by means of the woodwork coupled to the loud-speaker fret, is very distinctive.

Unlike a number of inexpensive receivers, the internal construction is equally as good as the construction of the cabinet. The whole receiver is built on a steel chassis with all of the minor components out of sight.

The smoothing choke has been very tightly clamped so that there is not the slightest possibility of lamination vibration. The smoothing circuit is carefully designed, for the hum level is such that only when the earth connection has been removed is it possible for you to hear any trace of ripple.

Test for Smoothing

When the reaction control is advanced and the receiver goes into oscillation the background still remains silent, which is a positive test for the effectiveness of the smoothing arrangements.

The coils are completely screened as are the valve, tuning condenser, and low-frequency choke. The first valve is a screen-grid high-frequency amplifier of the battery-operated type. It has a 4-volt .1-ampere filament. This is tuned-grid coupled to a triode detector, a 2-volt battery valve.

This detector works on the leaky-grid principle and gives the maximum sensitivity without showing any trace of being microphonic. The low-frequency stage is transformer coupled, while the output valve is a PT611 6-volt pentode.

You may wonder why these three valves are all of different filament voltage. As you probably know, the valves in a D.C. receiver have their filaments connected in series, and it is immaterial what voltage valves are used provided the filament currents are the same.

For example, in this receiver all that has been done is to connect a barrettor in series with the filaments. This barrettor only passes .1 ampere even though the voltage may change between 200 and 250.

As provision has been made for an external loud-speaker we connected across the tapping supplied a high-resistance unit. We found

that even though the receiver was not supplied with a variable tone corrector the quality was very good and well balanced. If a moving-coil loud-speaker is used you must make quite sure to use a step-down transformer of the correct ratio.

Incidentally, the loud-speaker supplied with this receiver is of the D.C. energised type, that is a unit that gives maximum sensitivity.

Feel of the Controls

You can generally tell whether or not a receiver is going to be any good by the feel of the controls. If the set has been well designed the manufacturers make quite sure to see that the switch makes a positive action or the tuner works without backlash. In this Lissen receiver the volume control, as we have mentioned, is a combination of variable resistance and reaction condenser, is very smooth and easy to handle. Actually the resistance is almost $2\frac{1}{2}$ inches in diameter, so that when you want to increase the volume you do not get that sudden increase noticeable with some small potentiometers.

With the tuner it is possible to separate stations only a fraction of a degree apart and actually make a note of the dial reading, for the clear calibration coupled with the hair-line makes the dial very easy to read.

Compared with A.C. Sets

After having tested a number of large A.C. receivers, we were rather doubtful as to whether a simple D.C. set would sound so pleasant. Lissen's have realised that you cannot get the same output from a D.C. set as from one running from A.C. mains, but they have made the most of the voltage available.

With a 200-volt D.C. supply the output is only 700 or 800 milliwatts, but the quality is very pleasing indeed. Box resonance has been completely eliminated, and at first you might get the impression there is a lack of bass. Then try the receiver on an organ broadcast and you will find the bass is there and very well defined without boom.

The selectivity using the maximum tapping with an aerial of about 40 feet is round about 14 kilocycles, which is very good indeed for a receiver with only one high-frequency stage. Daylight range is good, for by reducing the selectivity the stage gain increases and quite a large number of the more powerful European stations can be heard without any trouble at all.

IN A NUTSHELL

Brand Name : Lissen.

Model : 8043.

Technical Specification : This receiver, although called a four-valver, is actually a three for the fourth valve is a barrettor for regulating the voltage from the mains supply. The first valve is a high-frequency amplifier (Lissen SG410), which is coupled to a triode detector (Lissen HL2), which is transformer-coupled to an output pentode (Lissen PT611).

Price : £9 9s.

Type : Self-contained table model—walnut cabinet.

Power Supply : D.C. mains, 200-250 volts.
Makers : Lissen, Ltd., Worples Road, Isleworth, Middlesex.

On the Short Waves

Stop That Noise!

By KENNETH JOWERS

AMONG the mail this week were two letters from readers who had erected the doublet aerial with twin feeders. It was only when they wanted to connect this aerial to their receiver that they realised that as the aerial circuit was untuned they would have to use a special coupling circuit.

As you know, a doublet aerial consists of two separate aeriels with twin feeders spaced by means of transposition blocks. The feeders are then coupled to the grid coil in the high-frequency stage of the receiver by means of a small coil.

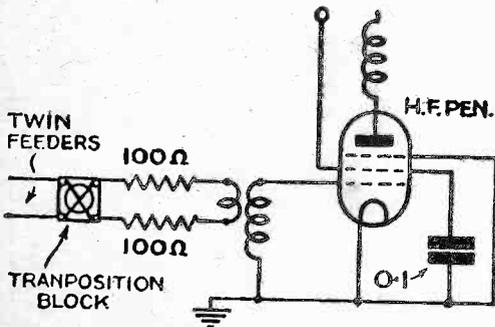
With a set having an untuned high-frequency stage and therefore no grid coil, the normal means of coupling is quite useless. If you look at the circuit you will see the proper way to do it.

The grid of the high-frequency pentode is anchored down to earth through a high-frequency choke which is wound on one half of a choke former. This choke is duplicated on the other end of the former, the two ends of which are then taken to the twin feeders through resistances of 100 ohms. The coupling between the two coils is ample and results are as good as if you were using a conventional tuned high-frequency stage.

Play About with Turns

If you use a choke former of about 1 1/2-in. diameter, 250 turns of 36-gauge enamel-covered wire would be ample, but you can play about with the turns on the coupling coil if you want to experiment.

This last week or so I have logged quite a number of commercial telephone stations not usually listed. These stations could be heard on quite a simple receiver and really should be added to your log. A good example is the new station at Panama City in Central America which is now on the air on 6,040 kilocycles—that is, 49.67 metres. This station has been erected at the Miramar Club, Panama and will broadcast club concerts.



Input circuit of short-wave screen-grid stage when the aerial arrangement includes a twin feeder with transposition block

Have you noticed that I2RO Rome is now on the air again? Two entirely separate transmitters are being used for the programme broadcasts and they can be heard in this country very well indeed. At the moment programmes intended for North America are being broadcast on Monday, Wednesday and Friday evenings on a wavelength of 30.67 metres.

This station also uses 48.7, 42.98 and, of course, the usual wavelength of 25.4 metres. I cannot get hold of the actual broadcast times, but from personal experience it seems that they are always on between 1800 and 2000.

Last Sunday morning I listened to Sydney and heard the new schedule for January and February. In future VK2ME will be on the air on Sundays only between 0600 and 0900, and 1100 and 1700.

Several readers have commented on the exceptional strength of PRF5, the Brazilian station at Rio de Janeiro. Verifica-

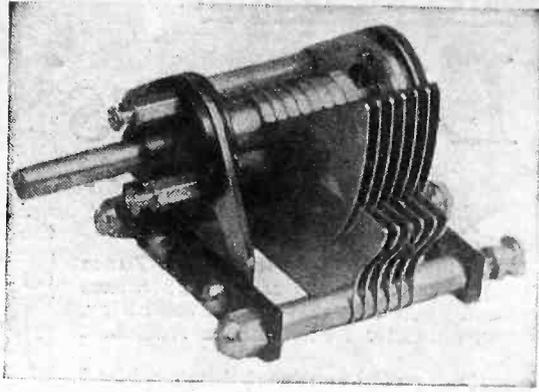
tions are gladly given providing an International Reply Coupon is sent. Your envelope should be sent to Mr. Salles Filho, Director of Brazilian Broadcasting, Rio de Janeiro.

Last week Percy Harris told you something about 5-metre experiments in America conducted by Arthur Lynch from the Hotel New Yorker. I have since heard some more details about these 5-metre transmissions.

On top of the Hotel New Yorker, as you know, is a highly efficient transmitter with directional aeriels. In addition to this station, transmitters have been erected on high points at Washington, Baltimore, Philadelphia, Hartford, West Hartford, Malden and Massachusetts. All of these stations are linked up with New York and signal strength between stations varies between R7 and R9.

There are quite a number of separate transmitters at Rio de Janeiro which are coming over very well at the moment.

PSA, for example, on 14.23 metres, is on the air almost all day calling New York. PSF on 20.4 and PSE on 20.7 are in constant touch with Madrid and Buenos Aires, while our old friend PRF5 on 31.5 metres is used solely for programme broadcasts.



Jackson .00025-microfarad tuning condenser for short-wave working. It has double-spaced vanes and is very quiet in action

A transmitter which you cannot fail to pick up is PSK on 36.65 metres, which is used to send special night telegrams intermingled with programme broadcasts for the benefit of listeners in Buenos Aires. The transmitters in use here are similar to the Daventry Empire stations but use 60 kilowatts.

Officially On the Air

I cannot guarantee just when you will hear musical programmes from PRF5, but in a letter from the station director I notice that they are officially on the air from 2230 giving news and from 2330 onwards giving programmes and news. This does not include Sundays.

F. A. Beane tells me that the 40-metre band tailed off in the Ridgewell district during the past week. The English stations have been quite reliable, the best were G5ML, G5MF, G6SR, G6JZ.

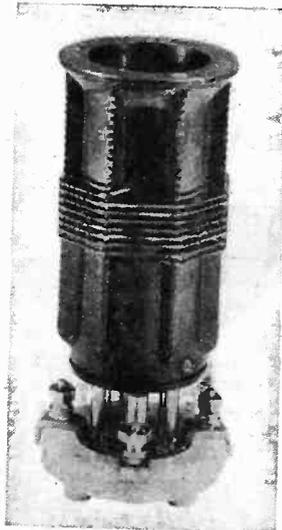
On the 80-metre band most of the stations logged seemed to have been Dutch with the exception of LA3G. Mr. Beane tells me that HB9B is transmitting a programme on 80 metres on Thursdays from 2100. The programme is intended for Swiss nationals abroad.

A new station heard is CT1GO on 24.2 metres, which is owned by the Portuguese Radio Club. This station has been heard by several listeners. Programmes are mainly musical.

In a letter from Loughton, Martin Railton, BRS1605, says that owing to very bad QRM the 40-metre band has been hopeless during the past week.

Even so, Mr. Railton's log is pretty good and includes SP1HZ, SP1WL, U1BC, LA31, FM8MG, W2GOQ on 20 metres, OZ4LM, HAF3H, HAF3GP and D4CSF on 40 metres.

R. D. Everard, of Standon, Herts, says that at the moment he finds the best time for 20-metre reception is between 1330 and 1815, peak time being approximately 1445. For 40 metres the best listening times are between 2145 and 2245. On 75 metres the American stations come in from 2330 and usually carry on until 0400, and Mr. Everard has heard W stations as late as 0830.



Stratton short-wave interchangeable tuning coil, which can be used for either grid tuning or oscillator circuits

Amongst stations heard this week on the loud-speaker were W9BPK, W8JHJ, VE1DR, W3CYF, all on 20 metres. On the 75-80-metre band W9BPU, W3IS, W3ADQ, VE1EI, etc. were heard. Altogether during the week Mr.

Continued on page 691

Readers' Views On This and That

Listeners' Letters

Dance-band "Murder"

To the Editor, AMATEUR WIRELESS.

I HAVE just listened to the B.B.C. Dance Band "murder" the "Dark Town Strutters Ball," and I was disgusted to hear this lilting, swinging, old-timer treated like a redundant dustbin.

Somewhere on the Continent there's a friend of my schooldays—thirty years ago—who then played this item.

As he was generally considered a brilliant pianist, it is fervently hoped that my old chum was busily engaged other than listening-in when this jolly, rollicking, old number suffered such humiliation and poor advertisement.

W. T. L.
Leyton, E.17.

[1166]

Short-wave Results

I FEEL I must write, although it is rather late, regarding the wonderful results I have had with your short-wave adaptor published by you three to four years ago, called "The World on Your Set," I believe.

I have had dozens of Americans—as I am writing W8XK (Lowell Thomas) is giving the news on 48.86 metres on loud-speaker on three valves (including the adaptor)—Nairobi (7LO), Java, and best of all in the last month I have received Sydney VK2MD, Australia, three times.

Last Sunday (December 9) was the best of all. Below is a summary:—

G.M.T.

3.00 Instructions to S. African listeners three times.

3.04 Record: Song by Peter Dawson, "Glory of the Motherland."

3.10 Record: Selection by State Opera Orchestra.

3.16 Records: Brass Band Selections.

3.21 Record: Reginald Foort on the Organ.

3.24 Record: Musical Items by Novelty Players.

3.30 Announced Australian time as 1.30 Monday morning and gave the Sydney call sign, Kookaburra bird, or Laughing Jackass.

3.32 Talk (fading).

3.46 Record: Piano solo (faint).

3.52 Nearly a fade-out—nothing distinguishable.

The above was till 3.30 on loud-speaker and later on 'phones.

Thanking you for a wonderful little set—and very cheap, too.
V. HURSON.
S. Norwood, S.E.25.

[1167]

Droitwich Distortion

RE remarks on front page of your December 15 issue—if you only knew the storm you have raised in parts of Devon and Cornwall! "The magic ring" indeed. From 120 miles and onwards Droitwich distorts to incoherence, as every one that has a wireless receiver knows to his cost!

You will be having a deputation à la Tre-lawney of historical fame, and the result will be a tombstone in a quiet country churchyard with the epitaph, "Here LIES an Editor!"

Again, it has been noticed that a straight set—an "A.W." one—distorted, and at the same time a super-het (also "A.W.") did not distort, neither did an A.V.C. super-het.

Reception is indeed so bad that there is concrete talk of a petition to Parliament against the regranting of a Charter to the B.B.C. on the grounds of inefficient service, and this will be pretty universally signed.

An engineer was sent by Mr. Ashbridge in the days of Daventry, and he had an eye-opener in my laboratory. From Plymouth (15 miles away) he could not even get a carrier wave on his special B.B.C. set without reaction.

He gave conditions a good trial for he was eight hours in my laboratory testing. So please add your weight to the complaints.

Evidence is accumulating in this particular district that the distortion is due to interference and to no other cause. Once or twice there has been very good day distortion.

As I have no axe to grind, my testing is quite impartial, and I am mostly interested in the scientific part of wireless; but if I do get something happening that should not, naturally I want to find the cause.

CRUSADER No. 1.
Calstock, Cornwall.

[1168]

Appreciation from South Africa

AS a keen amateur since the early days of radio, I wish to express my appreciation of the very creditable show put up by AMATEUR WIRELESS. In my opinion it is the best English publication on radio, and am satisfied it keeps one in touch with the latest trends.

One unfavourable feature, however, is the spoon-feeding of amateurs. It is all right and essential for novices, but if a novice starts with a set like the A.V.C.4, he fails to grasp the rudiments of radio—the Hiker's Portable is more in his line.

My own receiver is a combination of the best ideas in AMATEUR WIRELESS for the last year or so. The basic circuit is the television Purity Amplifier, with 7.5 watts output. Choke-coupled high-frequency stages and refinements suggested by Mr. Bonavia-Hunt contribute towards a result comparable with the best.

Unfortunately, I was one of those that was "had" with dud components—I now favour American ones.

By the way, I am impatiently waiting for more articles by Mr. Bonavia-Hunt—they're good. With regard to "The Experimenters," they have the authentic spirit of the true amateur.

Wishing you all success.

S. DEV. DE VILLIERS.
Johannesburg.

[1169]

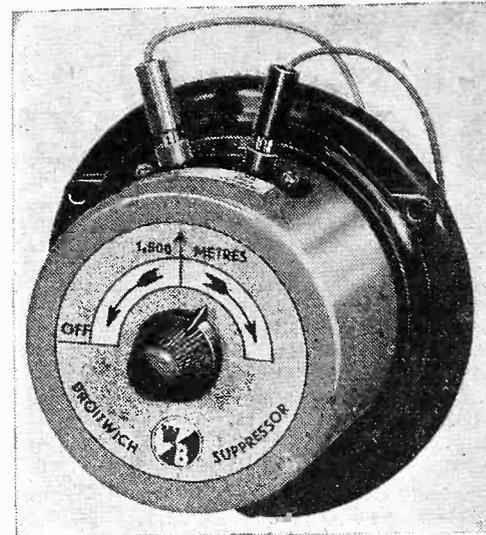
For DX'ers

IF you are a short-wave fan with time to spare, listen on January 12, 1935, on 49.02 metres for W2XE, which will be sending out a programme specially for DX'ers in this country—under International DX'er's Alliance sponsorship.

The time to listen is 11 a.m. to 1 p.m. and from 10 p.m. until midnight.

On January 13, station WHAM of America, on 260.7 metres, will provide listeners in this country with a chance to test the mettle of their broadcast sets. The time to listen is from 1 a.m. until 6.30 a.m.—rather the wee small hours, perhaps, but worth while as the programme is specially directed over here for members of the International DX'er's Alliance.

This information comes to us through the courtesy of W. ("Bill") Warner, Publicity Manager, I.D.A., of 56 East Grove Road, St. Leonards, Exeter, Devon.



Droitwich Wavetrap

FOLLOWING the wavetrap made up by "The Experimenters" recently, it is interesting to note that there are several commercial traps produced with the object of Droitwich suppression.

One of the most interesting is the W.B. model you see above. This has been designed not as a general-purpose trap, but for the express purpose of cutting out the 200-kilocycle Droitwich frequency.

The optimum tuning point is indicated on the dial, but for special circumstances it is possible to vary this setting slightly on each side of the Droitwich frequency.

The particular feature is that, being very carefully designed for use on the Droitwich station only, its tuning is much more selective than would be the case with a general-purpose trap.

This unit has been tried out in the Birmingham district, where the Droitwich transmissions are such a swamping influence, and it has been found possible to limit the spread very effectively.

The price is only 8s. 6d., which is very reasonable for such a good product. Delivery can be made from stock from Whitely Electrical Radio Corporation, Ltd., of Radio Works, Victoria Street, Mansfield, Notts.

New Television Kit

FOR the keen television constructor the new Wolsey kit of parts is ideal. This reliable and efficient disc receiver can now be obtained as a complete kit of parts, price £3 12s. 6d. The makers are Wolsey Television, Ltd., of 54 Lambs Conduit Street, London, W.C.1.

This list of parts includes an aperture disc with stroboscopic letter device, suitable for receiving the present 30-line low-definition transmission from London National.

Then there is a universal motor, with resistance adaptable for all the usual mains voltages, and also a variable speed control resistance.

A new and up-to-date television lamp is another big feature of the kit, together with a high-grade flat field lens and lens holder.

The complete kit of parts is in two parcels, one containing the disc packed on plywood—just another little evidence of the forethought that has gone into the production.

This simple, though effective little output outfit ought to help the amateur to gain at least an understanding of the fundamentals of the new scientific hobby of television. As such we can warmly recommend to all who are thinking of taking up this fascinating new field of amateur endeavour.

Full-size Blueprints

These blueprints show the position of each component and wire and make construction a simple matter. Copies of "Amateur Wireless" and of "Wireless Magazine" containing descriptions of most of these sets can be obtained at 4d. and 1s. 3d., respectively, post paid. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets. Send, preferably, a postal order (stamps over sixpence unacceptable) to "Amateur Wireless" Blueprint Dept., 58-61 Fetter Lane, London, E.C.4.

CRYSTAL SETS

Blueprints, 6d. each.

Four-station Crystal Set	31.3.34	AW427
1934 Crystal Set	4.8.34	AW444
150-mile Crystal Set	27.9.34	AW450

STRAIGHT SETS

Battery Operated

One-valvers: Blueprints, 1s. each.

B.B.C. One-valver	28.5.32	AW344
B.B.C. Special One-valver	6.5.33	AW387
Twenty-station Loud-speaker One-valver (Class B)	27.9.34	AW449

Two-valvers: Blueprints 1s. each.

Melody Ranger Two (D, Trans)	13.5.33	AW388
Full-volume Two (SG, Det, Pen)	17.6.33	AW392
Iron-core Two (D, Trans)	29.7.33	AW395
Iron-core Two (D, QPP)	12.8.33	AW396
B.B.C. National Two with Lucerne Coil (D, Trans)	17.2.34	AW377A
Big-power Melody Two with Lucerne Coil (SG, Trans)	17.2.34	AW388A
Lucerne Minor (D, Pen)	24.3.34	AW426
Family Two (D, Trans)	Apr. '32	WM278
£4 Two-valver (D, Pen)	Disc. '34	WM376

Three-valvers: Blueprints, 1s. each.

£8 Radiogram (D, RC, Trans)	21.5.32	AW343
New Regional Three (D, RC, Trans)	25.6.32	AW349
Class-B Three (D, Trans, Class B)	22.4.33	AW386
New Britain's Favourite Three (D, Trans, Class B)	15.7.33	AW394
Home-built Coil Three (SG, D, Trans)	14.10.33	AW404
Fan and Family Three (D, Trans, Class B)	25.11.33	AW410
£5 5s. S.G.3 (SG, D, Trans)	2.12.33	AW412
1934 Ether Searcher: Baseboard Model (SG, D, Pen)	20.1.34	AW417
1934 Ether Searcher: Chassis Model (SG, D, Pen)	3.2.34	AW419
Lucerne Ranger (SG, D, Trans)	3.3.34	AW422
Coscor Melody Maker with Lucerne Coils	17.3.34	AW423
P.W.H. Mascot with Lucerne Coils (Det, R.C, Trans)	17.3.34	AW337A
Mullard Master Three with Lucerne Coils	24.3.34	AW424
Pentaquester (HF, Pen, D, Pen)	14.4.34	AW431
£5 5s. Three: De-luxe Version (SG, D, Trans)	19.5.34	AW435
Lucerne Straight Three (D, RC, Trans)	9.6.34	AW437
All-Britain Three (HF Pen, D, Pen)	6.9.34	AW448
"Wireless League" Three (HF Pen, D, Pen)	3.10.34	AW451
Goodwill Three (HF, D, P)	8.12.34	AW459
Transportable Three (SG, D, Pen)	Feb. '32	WM271
Multi-mag Three (D, 2 Trans)	June '32	WM288
Percy Harris Radiogram (HF, D, Trans)	Aug. '32	WM294
£6 6s. Radiogram (D, RC, Trans)	Apr. '33	WM318
Simple-tune Three (SG, D, Pen)	June '33	WM327
Tyers Iron-core Three (SG, D, Pen)	July '33	WM330
C.-B. Three (D, LF, Class B)	Sep. '33	WM333
Economy-pentode Three (SG, D, Pen)	Oct. '33	WM337
All-wave Three (D, 2LF)	Jan. '34	WM348
"W.M." 1934 Standard Three (SG, D, Pen)	Feb. '34	WM351
£3 3s. Three (SG, D, Trans)	Mar. '34	WM354
Iron-core Band-pass Three (SG, D, QP21)	June '34	WM362
1935 £6 6s. Battery Three (SG, D, Pen)	Oct. '34	WM371

Four-valvers: Blueprints, 1s. 6d. each.

65/- Four (SG, D, RC, Trans)	17.12.32	AW370
"A.W." Ideal Four (2SG, D, Pen)	16.9.33	AW402
2 H.F. Four (2SG, D, Pen)	17.2.34	AW421
Crusaders' A.V.C. 4 (2 HF, D, QP21)	18.8.34	AW445
(Pentode and Class-B outputs for above; blueprints 6d. each)	25.8.34	AW445A

Quadradyne (2 SG, D, Pen)	Feb. '32	WM273
Calibrator (SG, D, RC, Trans)	Oct. '32	WM300
Table Quad (SG, D, RC, Trans)	Nov. '32	WM303
Calibrator de Luxe (SG, D, RC, Trans)	Apr. '33	WM316
Self-contained Four (SG, D, LF, Class-B Trans)	Aug. '33	WM331
Lucerne Straight Four (SG, D, LF, Trans)	Feb. '34	WM350

Five-valvers: Blueprints, 1s. 6d. each.

Super-quality Five (2 HF, D, RC, Trans)	May '33	WM320
New Class-B Five (SG, D, LF, Class B)	Nov. '33	WM340
Class-B Quadradyne (2 SG, D, LF, Class B)	Dec. '33	WM344

Mains Operated

Two-valvers: Blueprints, 1s. each.

Consoelectric Two (D, Pen)	A.C.	23.9.33	AW403
Goodwill Two (D, Pen)	A.C.	8.12.34	AW460
Economy A.C. Two (D, Trans)	A.C.	June '32	WM286

Three-valvers: Blueprints, 1s. each.

Home-lover's New All-electric Three (SG, D, Trans)	A.C.	25.3.33	AW383
S.G. Three (SG, D, Pen)	A.C.	3.6.33	AW390
A.C. Triodyne (SG, D, Pen)	A.C.	19.8.33	AW399
A.C. Pentaquester (HF Pen, D, Pen)	A.C.	26.6.34	AW439
All-Britain A.C./D.C. Three (HF, D, Pen)	A.C./D.C.	17.11.34	AW455
D.C. Calibrator (SG, D, Push-pull Pen)	D.C.	July '33	WM328
Simplicity A.C. Radiogram (SG, D, Pen)	A.C.	Oct. '33	WM338
Six-guinea AC/DC Three (HF Pen, D, Trans)	A.C./D.C.	July '34	WM364
Mantovani A.C. Three (HF Pen, D, Pen)	A.C.	Nov. '34	WM374
De-luxe D.C. Three (HF, D, Pen)	D.C.	Dec. '34	WM377

Four-valvers: Blueprints, 1s. 6d. each.

A.C. Melody Ranger (SG, DC, RC, Trans)	A.C.	4.3.33	AW380
AC/DC Straight A.V.C.4 (2 HF, D, Pen)	A.C./D.C.	8.9.34	AW446
A.C. Quadradyne (2SG, D, Trans)	A.C.	Apr. '32	WM279
All Metal Four (2SG, D, Pen)	A.C.	July '33	WM329

SUPER-HETS

Battery Sets: Blueprints, 1s. 6d. each.

1934 Century Super	9.12.33	AW413
Super Senior	Oct. '31	WM256
1932 Super 60	Jan. '32	WM269
Q.P.P. Super 60	Apr. '33	WM319

Advantages of the "A.W." BLUEPRINT SERVICE

Every blueprint is a full-size photographic reproduction of the original set as built in our own laboratories.

The positions—exactly—of every component used in the set are clearly shown.

Each wire is numbered in sequence so that you cannot put in an incorrect lead or leave out an essential one. The last number is always indicated on the print.

When the set is of chassis construction the holes through which leads pass from one side to the other are lettered, providing an infallible key to the top and bottom of the chassis wiring.

With a full-size blueprint before you there is a feeling of confidence that nothing short of the presence of the original set can equal.

Considering their good quality and invaluable aid to construction and wiring, the prices of our blueprints are decidedly modest.

"W.M." Stenode	Oct. '34	WM373
Modern Super Senior	Nov. '34	WM375

Mains Sets: Blueprints, 1s. 6d. each.

1934 A.C. Century Super	A.C.	10.3.34	AW425
1932 A.C. Super 60	A.C.	Feb. '32	WM272
Seventy-seven Super	A.C.	Dec. '32	WM305
"W.M." D.C. Super	D.C.	May '33	WM321
Merrymaker Super	A.C.	Dec. '33	WM345
Heptode Super Three	A.C.	May '34	WM359
"W.M." Radiogram Super	A.C.	July '34	WM364
"W.M." Stenode	A.C.	Sep. '34	WM376

PORTABLES

Four-valvers: Blueprints, 1s. 6d. each.

General-purpose Portable (SG, D, RC, Trans)	9.7.32	AW351
Midget Class-B Portable (SG, D, LF, Class B)	20.5.33	AW389
Holiday Portable (SG, D, LF, Class B)	1.7.33	AW393
Family Portable (HF, D, RC, Trans)	22.9.34	AW447
Town and Country Four (SG, D, RC, Trans)	May '32	WM287
Two H.F. Portable (2 SG, D, QP21)	June '34	WM362
Tyers Portable (SG, D, 2 Trans)	Aug. '34	WM367

SHORT-WAVERS

Battery Operated

One-valvers: Blueprints, 1s. each.

S.W. One-valve	23.1.32	AW329
S.W. One-valver for America	31.3.34	AW427
Roma Short-waver	10.10.34	AW452
Short-wave One	15.12.34	AW461

Two-valvers: Blueprints, 1s. each.

Home-made Coil Two (D, Pen)	14.7.34	AW440
Midget Short-wave Portable (D, P)	24.11.34	AW454

Three-valvers: Blueprints, 1s. each.

World-ranger Short-wave 3 (D, RC, Trans)	20.8.32	AW355
Experimenter's 5-metre Set (D, Trans, Super-regen)	30.6.34	AW438

Four-valvers: Blueprints, 1s. 6d. each.

"A.W." Short-wave World Beater (HF Pen, D, RC, Trans)	2.6.34	AW436
Empire Short-waver (SG, D, RC, Trans)	Mar. '33	WM318

Super-hets: Blueprints, 1s. 6d. each.

Quartz-crystal Super	Oct. '34	WM372
----------------------	----------	-------

Mains Operated

Two-valvers: Blueprints, 1s. each.

Two-valve Mains Short-waver (D, Pen)	A.C.	10.10.34	AW453
"W.M." Band-spread Short-waver (D, Pen)	A.C./D.C.	Aug. '34	WM368

Three-valvers: Blueprints, 1s. each.

Emigrator (SG, D, Pen)	A.C.	Feb. '34	WM352
------------------------	------	----------	-------

Four-valvers: Blueprints, 1s. 6d. each.

Gold Coaster (SG, D, RC, Trans) A.C.	Aug. '32	WM1292
--------------------------------------	----------	--------

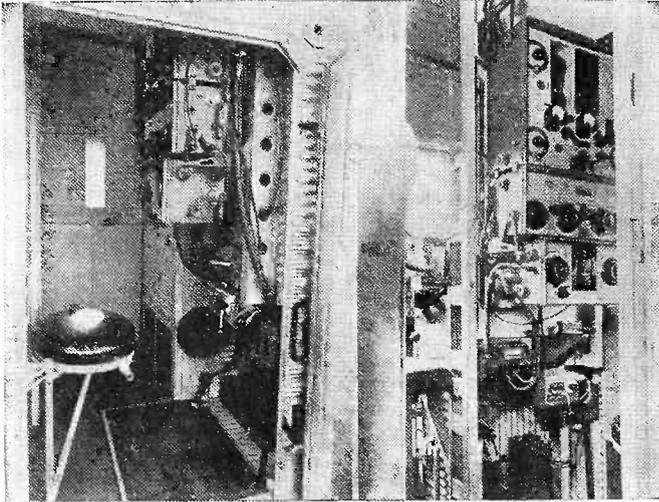
MISCELLANEOUS

Blueprints, 1s. each.

Short-wave Super-het Converter	23.1.32	AW329
Simple Trickle Charger	16.7.32	AW352
Battery-operated Amplifier	22.10.32	AW362
D.C. High-tension Unit	26.11.32	AW369
A.C. High-tension Adaptor	26.11.32	AW369A
Short-wave Plug-in Adaptor	23.1.33	AW326
"A.W." Push-pull Amplifier	11.2.33	AW376
Short-wave Adaptor	18.3.33	AW382
Super-het Short-wave Adaptor	8.4.33	AW385
Class-B Gramophone Amplifier	10.6.33	AW391
Three Class-B Units	2.9.33	AW400
Universal A.C. Amplifier (3-valve)	18.11.33	AW411
Valve and Set Tester	6.1.34	AW415
Experimenters' D.C. Mains Unit	7.4.34	AW430
Experimenters' A.C. Mains Unit	21.4.34	AW432
Valve Voltmeter	28.7.34	AW442
Add-on Two-valve Amplifier (battery)	28.7.34	AW443
Add-on H.F. Unit	1.12.34	AW458
Short-wave Adaptor	1.12.34	AW456
Short-wave Converter	1.12.34	AW457
Economy Gramophone Amplifier (battery)	Apr. '32	WM277
Dual-speaker Amplifier (A.C.)	Nov. '32	WM304
A.C. Mains H.T. Unit	Jan. '33	WM310
Five Q.P.P. Output Units	Mar. '33	WM315
Class-B Mains Unit	June '33	WM324
A.C. Short-wave Converter	Mar. '34	WM353
10-watt A.C. Amplifier	June '34	WM360
"W.M." Electric Gramophone	Sept. '34	WM369

"AMATEUR WIRELESS" BLUEPRINT DEPT., 58/61, Fetter Lane, London, E.C.4.

Wireless Over Africa!



Marconi transmitting and receiving equipment with homing device attachment, fitted in the new Junkers aircraft for South African Airways

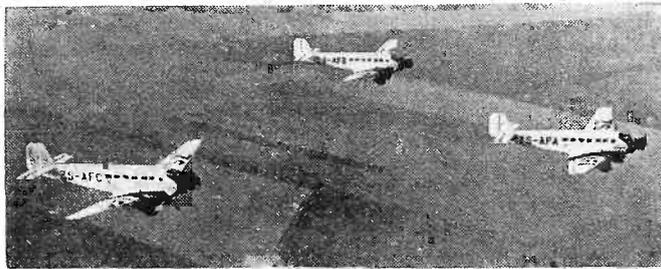
THE accompanying photographs show the Marconi installations in the Junkers aircraft recently delivered to South African Airways.

The three larger aircraft are fitted with transmitting and receiving equipment type A.D. 37/38, suitable for telephony and telegraphy on both medium and short wavelengths.

These will link up with the present London-Cape Town air route, while a number of smaller aircraft, operating internal routes, are fitted with the new Marconi medium-wave sets type A.D. 41/42.

All are to carry Marconi directional receivers as an aid to navigation.

The Marconi Company provided an experienced engineer and two expert operators to accompany the aircraft on their delivery flight



Junkers aircraft for South African Airways photographed in flight. These aircraft are fitted with Marconi combined medium- and short-wave transmitting and receiving equipment, with the homing device as an aid to navigation

from Europe to South Africa, during which excellent wireless working was attained on all machines.

On the medium waves they gave a practically uniform performance of two-way communication over six hundred miles on continuous-wave telegraphy.

On short waves (with the A.D. 37/38 equipments) good telegraph working was carried out with Victoria West over twelve hundred miles and two-way telephony over one thousand miles.

Ranges between the machines in flight were up to one hundred and thirty miles by telephony and two hundred miles by telegraphy.

"Homing" was also successfully used on most stages of the flight, at ranges of one

hundred miles on Athens, five hundred miles on Almaza, one hundred and fifty miles on Kisumu, one hundred miles on Salisbury (Rhodesia) and three hundred miles on Germiston.

Leaves from My Short-wave Log

By J. Godchaux Abrahams

IF good results are to be obtained, the short-wave fan when searching for transmissions should make a point of setting out with a definite object. Although a casual twirl of the condenser dial may, at odd moments, capture a broadcast, it is an unsatisfactory method, as so much time is then wasted in an endeavour to identify the transmission.

Bear in mind that not only is there always something on the air, but that our task has not been facilitated by the fact that many stations have been induced to put out special entertainments at favourable hours for the benefit of distant listeners.

Reception Reports

The International Short-wave Clubs and D.X'ers Associations are proving their utility to studios in many countries by furnishing reception reports, a valuable piece of information when experiments are carried out. The net result is that the transmitters are showing increased willingness to broadcast special programmes destined to all nations.

A recurring transmission is that given by the Basle Radio Club (HB9B), Switzerland,

every Thursday evening between G.M.T. 2100-2130.

Now, also, is the time to try to capture broadcasts from the Byrd Antarctic Expedition, of which the base is at the Bay of Whales, Little America, as a recent message picked up through one of the Schenectady (New York) stations states that the members will be leaving for New Zealand towards the end of January, some time earlier than was expected. The s.s. *Jacob Ruppert*, which is equipped with wireless, leaves on January 12.

It may be difficult to pick them up direct, but the following channels are those most used, (KFZ): 22.68, 25.63, 33.94, 44.95 and 45.05 metres.

Alternatively, try for LSX, Buenos Aires, on 28.99 metres, KKP, Kahuku (Hawaii) on 18.71 metres, or more frequently WEF and WEM, Rocky Point on respectively 28.25 and 40.54 metres.

Between G.M.T. 0200-0300 on Thursdays you may hear the operators arranging for the broadcasts from or to the United States. Anyhow, it is worth a trial as it may be some years before you get a chance again.

Continental Radio News

By Jay Coote

FURTHER and more definite news from the Hague shows that far from giving up the long-wave channel (1,875 metres) used by Holland for so many years, the Dutch authorities have decided to close down Huizen and replace it by the Kootwijk transmitter, which has been broadcasting these programmes in the evening hours. Moreover, the power of this station is to be increased.

In addition, through the assistance of the State, which will now definitely control the Dutch broadcasting system, a new high-power station will be built at Hilversum.

Although the German stations have been amongst the earliest to come on the air, so far they have limited their broadcasts to physical exercises, weather forecasts, and news bulletins. From December 16, the Deutschlandsender, however, has given its listeners a surprise, inasmuch as the early morning hour is now devoted to humour.

Some of Germany's "comics" are recruited for this particular job, as in the opinion of the studio authorities the nation should wake to a cheerful good morning even if the day is a specially gloomy one. This lively hour will continue until further notice.

Personally, I should be sorry if the B.B.C. followed a similar example, as if there is anything I loathe it is joking and funny stuff at the breakfast table.

Have you noticed how much louder the Breslau broadcasts have been during the
Continued on page 692

"ELECTROMICRO"

The Microphone for Home Broadcasting comes to you ready for immediate use with your radio set. Stage your own broadcast programme by having your artistes in a room adjacent to the sitting-room occupied by your visitors.

In addition to creating amusement, it is perfect for experimental work. Simple instructions for use sent with every "Electromicro."

9/6
See article on microphones in this issue of "Amateur Wireless," page 674. Complete, with transmitter in base of stand. Sent post paid.

LOTUS

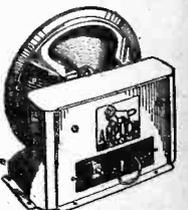
DOUBLE PENTODE UNIVERSAL MODEL 33
This 1935 model Universal Receiver works on any mains (A.C. or D.C.) of 150 to 250 volts, without any adjustment.

It brings you entertainment from several stations, all at good volume and with quality reproduction.

COMPLETE FOR
£4 - 17 - 6
H.P. Terms available.
Descriptive Leaflet "A" Free.

AMPLION "LION" P.M. MOVING-COIL SPEAKER

With Universal Transformer, 1-20 ohms and 2,000-40,000 ohms, 7 in. cone. Cash or C.O.D. Carriage Paid, 47/6. No extra cost for easy terms: 5/- down and balance in 10 monthly payments of 4/3.

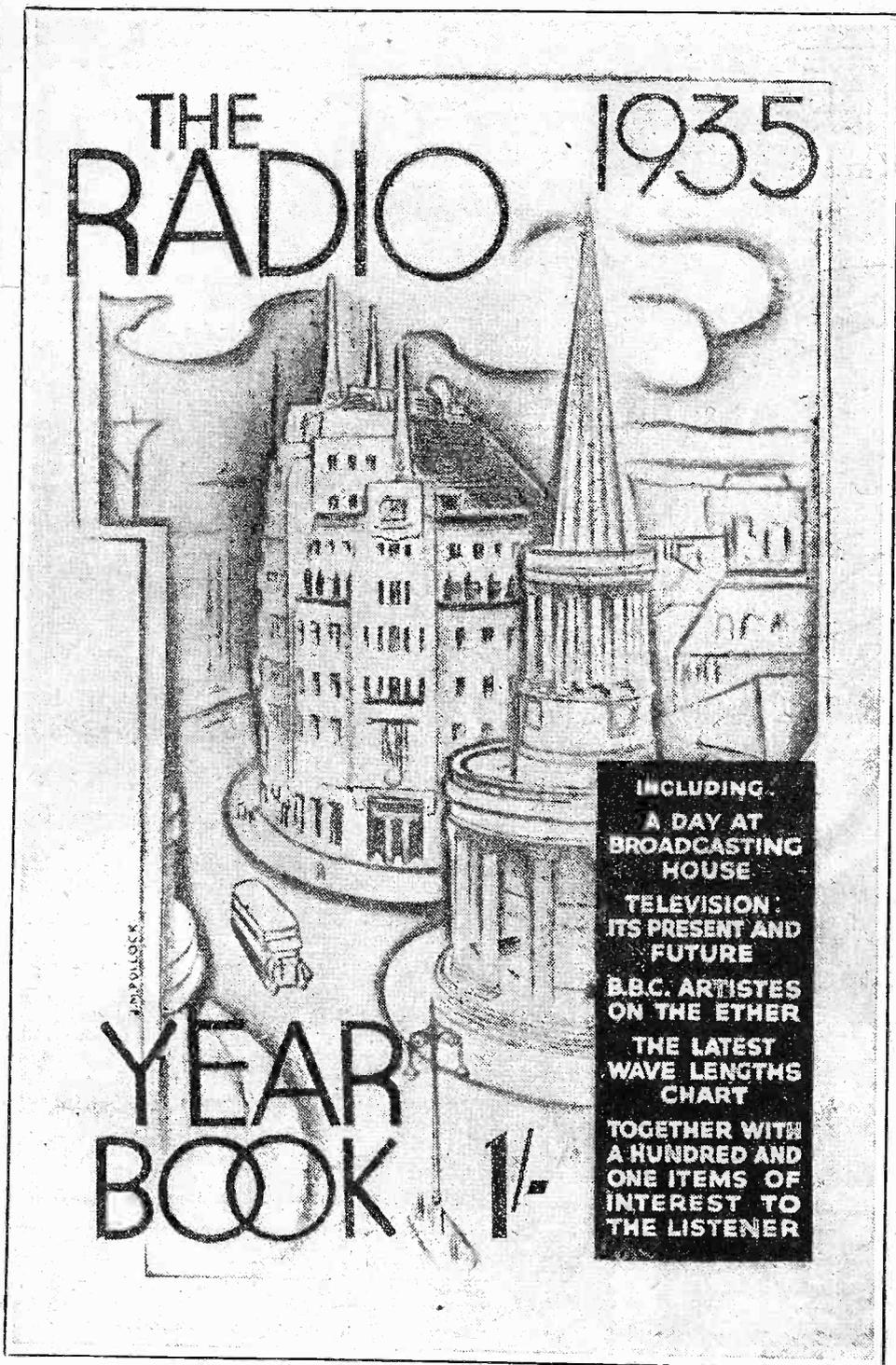


All the above from:
PEARL & PEARL,
190, BISHOPSGATE, LONDON, E.C.2

THE NEW RADIO YEAR BOOK

192 PAGES

1s.



- SOME OF THE CONTENTS:**
- INTRODUCTORY—**
 Brief history and recent developments of the B.B.C. Review of the programmes of 1934. Outline of likely features for 1935.
 - THE BRITISH ORGANISATION—**
 A day in Broadcasting House. Personalities. Work of the announcers and non-technical staff.
 - A SECTION OF REFERENCES** by Ralph Stranger.
 Wavelengths, foreign stations, law relating to wireless, licences, etc.
 - TECHNICAL**
 by Ralph Stranger—
 Radio in the home and garden; remote control; electric and portable radio; mains radio and radiogram.
 - TELEVISION**
 by Ralph Stranger—
 The latest developments.
 - RADIO PERSONALITIES**
 by Garry Allighan—
 Short biographies covering interesting details in the lives of radio stars.
 - PROGRESS OF EDUCATION OVER THE AIR**
 by C. A. Siepmann.
 - MUSIC IN THE PROGRAMMES**
 by Dr. Adrian Boulton.
 - DEVELOPMENT OF RADIO DRAMA** by Val Gielgud.
 - DANCE MUSIC**
 by Henry Hall.
 - LIGHT ENTERTAINMENT**
 by Eric Maschwitz.

On sale at all Newsagents and Bookstalls, or by post 1s. 2d. from the Publishers

GEORGE NEWNES, LTD., 8-11 SOUTHAMPTON ST., STRAND, LONDON, W.C.2

Packed from cover to cover with interesting facts

Criticism by WHITAKER-WILSON

My Broadcasting Diary

SINCE this page went to press for last week's issue I have heard so much criticism of an American vaudeville singer that I think I am justified in making a point regarding vaudeville singers, American or otherwise.

I heard the singer in question. Her name was Belle Baker. She annoyed me so much that I did not refer to her. She appears to have annoyed all my friends, too. Still, let's be fair to her. Nothing against her as a singer. She has a good voice, so far as that goes. *It was the sob-stuff she sang that annoyed us all.*

Perhaps you remember the song, sung to all the mothers in the "world." If you do I need say no more. If you don't, I need say no more either. The whole point is one for the variety direction. Sob-stuff of that sort, with the singer weeping all over the microphone, irritates Englishmen — and women too, probably.

Sunday

THE International String Quartett. Meant to hear it, but forgot all about it when the time came.

Missed the *Farewell Symphony* of Haydn in the orchestral concert, but I meant to do that because I am not keen on it. So my listening was a nice browse over the fire with Alma Moodie playing the Saint-Saens concerto. Smoked two pipes over it and planned out a whole lot of things at the same time. Have you ever done that—listened to good music, perfectly played, and let your mind wander about? Does the thing no end of good. Try it.

Monday

SHOW BOAT and Edith Day in same. A very good show and she a first-

rate artist. Nobody could reasonably complain of that sort of broadcast.

Tuesday

THE "Air-do-wells" doing very well. They will do better still when every line is scrutinised for its value. Some poor ones slithered through. I want to see these people establish themselves. In other words, we want just one more reliable regular feature.

Mr. Bryan Michie can then say he has bequeathed them to the listening public as the "Heir-do-Wells."

Wednesday

THE programme said "Come again to the Chateau de Madrid for a Gala Night of Spanish Song and Dance with the New Orquesta Hispanica." My wife doesn't like my going to that sort of do, but I wanted to hear the Orquesta. It occurred to me that one would need to be very sober to say *Hispanica* nicely—anyhow, I listened to the

Orquesta.

Very good, too, but the Maitre d'Hotel tried to imitate the feller who looks after the Cafe Colette and missed the bus. He was dull. I now recommend the words *Orquesta Hispanica* (to be said three times) as a new test at the Scots Scotland Yard—wherever it is—on New Year's Eve.

I really wanted to go up and hear Carl Flesch in the flesh, but was prevented at the last moment. I heard him broadcast, all the same. A magnificent performance of the Brahms fiddle concerto and my loud-speaker reproduced him perfectly. Also a word for the Orquesta Queensallica in the *Eroica* of Beethoven(ica).

I heard the Introductory Talk to the concert by Geoffrey Shaw. What he said was good enough, but *how dull!* I do wish these talkers would remember they are not addressing students at an

academy but the Man-at-home. These talks, as they are given at present, are all wrong. They want livening up. Mr. Shaw must not get prosy yet. Plenty of time for that when he is as old as you or I.

Thursday

WHAT a night I've had! Alternating and alternating alternight, so to speak. First I risked their awful weather and went to Manchester to hear Sir Thomas Beecham and the Halle people. Was thrilled over the Brahms *Variations* and the Mozart. I tore away at the interval and arrived at the B.B.C. in time to hear Jean Harley and George Baker, who sang delightfully and with perfect diction.

Dying to get back to Manchester, but was held up by the Dotty Ditties, second spasm. Better than the first. Indeed, quite clever. Third edition must be given at the proper time—five-fifteen in the Children's Hour.

Then the suggestive subtleties of Mr. Murgatroyd and Mr. Winterbotham. Oh, Mr. Wintertroyd! Oh, Mr. Murgabotham! I recognised your voices at once. Oh Tommy, Oh Ronald! How funny you were! How pure am I!

Then I rushed down to the Hippodrome for Bobbie Howes and Binnie Hale in "What are you going to do?"

What was I going to do? Get back to Manchester, as I couldn't see much point in relaying *that* from the Hippo.

Heard the last part of the Scheherazade. Suggestion for Sir Thomas. Cut out the top E (solo violin) at the end. Sounded as though someone had left the gas on.

Friday

THE GREAT ADVENTURE (Arnold Bennett). Definitely good broadcasting and interesting all through. First time I have listened for an hour and a half to a play and not felt weary.

Saturday

VAUDEVILLE good in places. Keith Wilbur's vocal imitation of a Hawaiian guitar; Harry Roy's band and good comedy; Stainless Stephen's topicalities the high spots.

Walter Williams and Marjorie Lotinga in "Odds and Ends" quite good. Their singing their best. Their jokes their worst—the odds, I suppose.

I should like to hear them again in something more suitable.



An impression of Edith Stamp-Taylor, who broadcast recently from Radio Luxembourg

**HIGHEST in QUALITY
LOWEST in PRICE**

Absolutely non-microphonic detector types, S.G. types of exceptionally low inter-electrode capacity. Output valve giving larger undistorted output than "luxury" price valves. Guaranteed for 6 months.

362 BATTERY VALVES
H.H.L. & L., 3/6; Power, 4/-; Super Power, 4/6; S.G. & V.S., 7/6; Pentode type, 10/-; B.A. & B.X., 9/-; B.P.2, 9/-.

362 A.C. MAINS
ACHL4, 7/6; ACPX4, 9/-; ACPX4 & ACVS4, 12/6; ACME4 & ACHM4, 13/-; ACVP4, 13/-. Full Wave Rectifiers, RB41, 7/6; RB42, 10/-.

IF UNOBTAINABLE LOCALLY—SEND P.O. DIRECT to
Dept. O, 362 RADIO VALVE CO. LTD., STONEHAM ROAD, LONDON, E.5.

H.L.L.
3/6

362

**THE VALVE WITH
THE 6 MONTHS'
GUARANTEE**

ELEMENTARY WIRELESS FOR THE BEGINNER

"An Elementary Wireless Course for Beginners" has been written particularly for the listener who wants to know how his wireless set works. The Course takes the reader in easy stages right through all the processes of wireless reception. It avoids text-book style, every line is technically accurate.

131 ILLUSTRATIONS!

The unique illustrations, of which there are 131 in all, are a remarkable feature and constitute the finest series of explanatory diagrams ever included in any volume on the subject.

AND OVER 270 PAGES!

The 32 chapters of this book cover nearly 300 pages, at the remarkably low cost of 3s. 6d.

Send for your copy to-day, together with remittance for 3s. 10d. to the publishers

BERNARD JONES PUBLICATIONS LTD.
58-61 Fetter Lane, London, E.C.4

Medium-wave Broadcasters

This week we give details of all the important European medium-wave stations. Next week we shall publish a list of short- and long-wave transmitters.

Mctres	Kilocycles	Station and call sign	Country	Power (Kw.)	Mctres	Kilocycles	Station and Call Sign	Country	Power (Kw.)
203.5	1,474	Plymouth	Great Britain	3	304.3	986	Genoa	Italy	10
203.5	1,474	Bournemouth	Great Britain	1	304.3	986	Cracow	Poland	17
204.8	1,467.2	Pecs	Hungary	1.25	307.1	977	West Regional	Great Britain	50
206	1,456	Fccamp	Hungary	2	309.9	968	Grenoble PTT	France	15
207.3	1,447	Miskolc	Hungary	1.25	312.8	959	Poste Parisien, Paris	France	60
209.9	1,429	Newcastle	Great Britain	1	315.8	950	Breslau	Germany	60
209.9	1,429	Beziers	France	1.25	318.8	941	Goteborg	Sweden	60
211.3	1,420	Cork	Irish Free State	1	318.8	941	Algiers	North Africa	10
215.4	1,393	Tampere	Finland	1.2	321.9	932	Brussels (2)	Belgium	15
216.8	1,384	Radio Lyon	France	5	325.4	922	Brno	Czechoslovakia	32
218.2	1,375	Warsaw (2)	Poland	10	328.6	913	Radio Toulouse	France	69
221.1	1,357	Basle, Berne	Switzerland	5	331.9	904	Hamburg	Germany	100
222.5	1,348	Milan (2)	Italy	2	335.2	895	Limoges PTT	France	7
222.6	1,348	Konigsberg	Germany	4	335.2	895	Helsinki	Finland	10
222.6	1,348	Dorpat	Estonia	5	338.6	886	Graz	Austria	7
222.6	1,331	Paris (Victus)	France	5	342.1	877	London Regional	Great Britain	50
222.6	1,343	Dublin	Irish Free State	7	345.6	869	Poznan	Poland	20
224	1,339	Lodz	Poland	1.7	345.6	868	Fredrikstad	Norway	7
224	1,337.9	Montpellier	France	8	349.2	859	Strasbourg	France	11.5
225.6	1,330	Hanover and other	Germany	1.5	352.9	850	Bergen	Norway	7
227.1	1,321	Hamburg relays	Germany	1.5	352.9	850	Valencia	Spain	7
230.2	1,303	Magyarova	Hungary	1.5	356.7	841	Sofia	Bulgaria	1
231.8	1,294	Danzig	Germany	1.5	356.7	841	Berlin	Germany	100
233.5	1,285	Linz and other	Austria	5	360.6	832	Moscow (4)	U.S.S.R.	100
235.1	1,276	Vienna relays	Austria	5	362.8	827	Radio LL Paris	France	2
236.8	1,267	Aberdeen	Great Britain	1	364.5	823	Bucharest	Roumania	12
237.2	1,258	Stavanger and other	Great Britain	1	368.6	814	Milan	Italy	50
238.5	1,258	Oslo relays	Norway	5	373.1	804	Scottish Regional	Great Britain	50
238.5	1,258	Augsburg	Germany	25	377.4	795	Lwow	Poland	16
238.5	1,258	Bordeaux S.O.	France	25	382.2	785	Barcelona (EAI)	Spain	8
240.2	1,249	San Sebastian (EAI8)	Spain	3	386.6	776	Leipzig	Germany	12
243.7	1,231	Rome (III)	Italy	1	386.6	776	Fredrikstad	Norway	7
243.7	1,231	Juan-les-Pins	France	8	391.1	767	Toulouse PTT	France	7
243.7	1,231	Dresden	Germany	25	395.8	758	Midland Regional	Great Britain	25
243.7	1,231	Nurnberg	Germany	2	400.5	749	Katowice	Poland	12
245.5	1,222	Gleiwitz	Germany	5	405.4	740	Marseilles PTT	France	1.6
247.3	1,211.9	Trieste	Italy	10	410.4	731	Munich	Germany	100
249.2	1,204	Lille PTT	France	1.3	410.4	731	Seville	Spain	2
251	1,195	Frankfurt-am-Main	Czechoslovakia	5	420.8	713	Madrid (España)	Spain	3
253.2	1,185	and relays	Germany	17	426.1	704	Tallinn	Estonia	20
255.1	1,176	Kharkov (2)	U.S.S.R.	20	431.7	695	Rome	Italy	50
257.1	1,167	Copenhagen	Denmark	10	437.3	686	Stockholm	Sweden	50
259	1,158	Monte Ceneri	Switzerland	15	443.1	677	Paris PTT	France	7
261.1	1,149	Kosice	Czechoslovakia	2.5	449.1	668	Belgrade	Yugoslavia	2.5
261.1	1,149	London National	Great Britain	50	455.9	658	Sottens	Switzerland	25
263.2	1,140	West National	Great Britain	50	463	648	North Regional	Great Britain	50
265.3	1,131	Turin (1)	Italy	7	470.2	638	Cologne	Germany	17
267.4	1,122	Horby	Sweden	10	476.9	629	Lyons PTT	France	15
267.4	1,122	Belfast	N. Ireland	1	483.9	620	Trondheim	Czechoslovakia	120
269.5	1,110	Nyiregyhaza	Hungary	6.25	491.8	609	Prague (I)	Norway	20
271.7	1,104	Moravska-Ostrava	Czechoslovakia	11	499.2	601	Florence	Italy	20
271.7	1,104	Naples	Italy	1.5	499.2	601	Sundsvall	Sweden	10
274	1,095	Madona	Latvia	1	506.8	592	Rabat	Morocco	6
274	1,095	Madrid EAJ7	Spain	1.3	514.6	583.2	Vienna	Austria	120
276.2	1,086	Vinnitsa	U.S.S.R.	10	514.6	583	Riga	Latvia	15
276.2	1,086	Falun	Sweden	5	522.6	574	Agen	France	6
278.6	1,077	Zagreb	Yugoslavia	75	531	565	Stuttgart	Germany	100
280.9	1,068	Bordeaux PTT	France	13	539.6	556	Athlone	Irish Free State	67
283.3	1,059	Tiraspol	U.S.S.R.	4	550.5	545	Beromunster	Switzerland	60
285.7	1,050	Bari	Italy	20	559.7	536	Budapest	Hungary	120
288.6	1,040	Scottish National	Great Britain	50	569.3	527	Wilno	Poland	16
291	1,031	Leninrad (2)	U.S.S.R.	10	569.3	527	Bolzano	Italy	1
291	1,031	Rennes PTT	France	1.3	578	519	Viiuri	Finland	10
293.5	1,022	Paredo (Lisbon)	Portugal	5	696	431	Ljubljana	Yugoslavia	5.3
296.2	1,013	Heilsberg	Germany	60	748	401	Innsbruck	Austria	5
298.8	1,004	Barcelona (EAI15)	Spain	1	748	401	Oulu	Finland	1.2
301.5	995	North National	Great Britain	50	748	401	Geneva	Switzerland	1.5
		Bratislava	Czechoslovakia	14	765	392	Moscow	U.S.S.R.	20
		Hilversum	Holland	20	766	413.5	Ostersund	Sweden	2.6
							Boden	Sweden	6

"Stop That Noise!"

Continued from page 685

Overheard heard 70 stations on the loud-speaker. J. D. Beresford, from Kendal, is interested in a kite flying—not solely for the fun of it, but he has an idea that short-wave reception might be improved by having an aerial attached to a kite, particularly on top of some of the high hills in his area.

He Wants Two Kites!

He wants to have two kites and attach to them a complete doublet aerial, all made, of course, with very fine gauge wire and specially light transmission blocks. He has already tried a simple aerial on a two-valve receiver and has had some very good results. Whether this was due to the kite aerial or his normally good conditions has yet to be seen.

Anyway, several amateurs are experimenting at the moment on this kite-flying business and doubt in a week or so we shall have some concrete details as to whether it is really worth the trouble.

Television in 1935

IT is safe to prophecy that 1935 will see the real inauguration of television. The publication of the findings of the P.M.C.'s Committee which is expected some time in January is sure to be the signal for great activity, and it is expected that preparations will at once begin for the commencement of a definite programme of public service.

There is every reason, therefore, that the public should obtain some insight into the new science. "Television," the shilling monthly, is full of practical information. In the January, 1935, issue, now on sale, there are many special features for the beginner and included in a comprehensive series of articles are the following:

- Televising Actual Scenes; Simple Television Optics; The Talking Light Beam; An Iconoscope Experimental System; A Novel Method of Controlling Motor Speed; Experimental Apparatus; Some Recent Developments.

ELECTRADIX MICROPHONE BARGAINS

Lesdix Pedestal Mikes. One of the most popular in the LESDIX range is the No. 12 "T." This super sensitive mike is excellent on both speech and music. Triangular spring suspension. Diameter of Mike 2 1/2 in. Height of stand 8 in. See editorial reference on page 674 of this issue. A special matched Transformer for the No. 12 "T." costs only 4/6. Price of No. 12 "T" Mike is 18 6.

Ericsson model transmitters, standard type, with stand and microphone, as illus., 4 6. Postage 1/6.

A New Practical Home Microphone for broadcasting at home. It is a general purpose, robust mike, with solid bakelite body, back terminals, front metal grill. No. 11. New design, finely finished. 5/6

No. 11A. Special in solid brass body unequalled at the price on speech and music. 7/8

"A.W." No. 11 Table Mike. This is a splendid 2-in. mike and transformer, in a splendid 2-in. pedestal. Switch and plug sockets are fitted on the case. It stands unrivalled for quality and price. 15/-

Crooners Lapel Mikes for Dance Bands. American type model. 12/6

Microphone Buttons for all purposes. Usually sold at 3/6. Our price has always been 1/-.

We have supplied thousands to home users. A wonderfully interesting and useful Transmitter Unit, for fun with your home radio, detectaphones, baby alarm, rat hunts, speech amplifiers, etc. Usual price 5/-. As supplied to G.P.O. Our price 1/- only. Post 1/6.

Parts for Home Constructors. Microphone Carbon Granules in glass capsule, for four buttons. Grade No. 1, 8d., No. 2, Medium, 1/-; No. 3, Fine, 1/6; Carbon, solid back blocks, 4d. Mouthpieces, curved or straight, 10d. Carbon diaphragms, 55 M/m., 6d. Panel Brackets, pivoted, 5/-. Reed Receiver for Button Amplifier making 3/-.

Headphones, L.R., 2/9.

Microphones. Low prices, all purposes. We are makers and carry the biggest and most varied stock in London. "Microphone Marvels" Illustrated Booklet by Lafone 9d. post free.

ELECTRADIX RADIOS

218 Upper Thames Street, London, E.C.4
Telephone: CENTRAL 4811

ENGINEERS! ARE YOU EARNING LESS THAN £10 PER WEEK?

If so, you cannot afford to carry on without reading our 256-page Handbook. The book explains clearly and definitely many ways of carving out a successful career. Among other things, it explains the Services of our unique Appointments Department, outlines Home-Study Courses in all branches of Civil, Mechanical, Electrical, Motor, Aero, Wireless, "Talkie" Eng., Building, etc., and gives details of B.Sc., A.M.I.C.E., A.M.I.A.E., G.P.O., Matric., and all Exams. We alone Guarantee—"No Pass—No Fee."

Whether you be an old hand or a budding apprentice, get this book to-day—FREE and POST FREE.

BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY
409 Shakespeare House, 29 31 Oxford Street, London, W.1.

Add 50/- WEEKLY to your earnings

by charging accumulators in your spare time.

Complete plant for A.C. mains incorporating Westinghouse Rectifiers to charge 100 L.T. cells weekly. Trade price £4 4s. or 6/- monthly. Send for descriptive Booklet.

M.P.R. Ltd ROMFORD ESSEX.

ALL THE ENGLISH programmes from the CONTINENT

Every Friday in RADIO PICTORIAL PRICE 3D

PREPAID ADVERTISEMENTS

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

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

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

The amount of the Deposit and Fee must be remitted by Postal Order or Registered Letter (Cheques cannot be accepted), addressed to

"Amateur Wireless" Advertisement Department, 58-61 Fetter Lane, London, E.C.4.

REPAIRS TO MOVING-COIL SPEAKERS.—Cones and Coils fitted or rewound. Eliminators and Transformers quoted for. Loud-speakers, L.F. and Speech Transformers, 4/- each, post free. Trade invited. Satisfaction guaranteed. Prompt service.—Loud-speaker Repair Service, 5 Balham Grove, London, S.W.12. Battersea 1321.

WANTED.—Good Modern Wireless Parts, Sets, Eliminators, Meters, Valves, Speakers, etc. Spot Cash waiting. Exchanges. Send or bring. We pay more than any other dealer. Open 9-8.—University Radio, 142 Drummond Street, Euston, N.W.1. Phone: Museum 3810.

A/C ACCUMULATOR CHARGERS. Entirely new improved type, fitted with Westinghouse rectifier and lamp indicator. 2 volt. 3 amp., 19/6. Other sizes up to 12 volts 3 amps. Latest lists free.—Thompsons, 39 London Street, Greenwich, S.E.10.

CAMCO RADIOGRAMPHONE CABINETS AT 40/-.—Special offer in mahogany, complete with polished panel, 18 in. by 7 in.; baseboard, 15 in. Listed at £6 15s., now 40/-. Also other remarkable bargains. Send for list.—Carrington Mfg. Co., Ltd., 24 Hatton Garden, E.C.1.

HIGHEST POSSIBLE ALLOWANCE made on used wireless goods in exchange for new sets, components, or Peto-Scott kits. All latest receivers supplied on easiest of terms.—R. Wigfield, Furlong Road, Goldthorpe, Yorks.

PEARL & PEARL

90 Bishopsgate, London, E.C.2. The following eliminator bargains are guaranteed new goods. Cash or C.O.D. Carriage Paid.

ELIMINATORS.—Special purchase of large quantity of Lincoln-Stewart eliminators enables us to offer them at sacrifice prices. All models O.K. for 200-250v. D.C. 25 milliamp output, 9/11; A.C. 30 milliamp output with Westinghouse Rectifier, etc., 24/11, or with half amp. Trickle Charger incorporated, price only 37/6. All fully guaranteed by Pearl & Pearl.

INFORMATION BUREAU

Will every querist please observe the following revised rules?

Please write concisely, giving essential particulars. A fee of one shilling, postal order (not stamps), a stamped, addressed envelope and the coupon on this page must accompany all queries.

Not more than two questions should be sent at any time.

The designing of apparatus or receivers cannot be undertaken.

Slight modifications of a straightforward nature only can be made to blueprints. For more serious alterations the minimum charge is 2/6.

Blueprints supplied by us will be charged for in addition, but, of course, readers may send their own blueprints for alteration.

Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken. Readers' sets and components cannot be tested by us. **Queries cannot be answered by telephone or personally.** Readers ordering blueprints and requiring technical information in addition should address a separate letter to the Information Bureau and should see that their remittance covers the price of the Blueprint and the amount of the query fee.

We do not answer queries in cases where the fee is omitted.

Queries should be addressed to the Query Dept., "Amateur Wireless," 58/61 Fetter Lane, London, E.C.4.

Postcard Radio Literature

Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them FREE OF CHARGE, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," AMATEUR WIRELESS, 58-61 Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire. Please write your name and address in block letters.

Eddystone's for Short Waves

A FINE sixteen-page illustrated catalogue is now available from Stratton & Co., Ltd. This contains extensive details of the latest components for short and ultra-short-wave work. While the items are too numerous to mention in this column, the following are rather distinctive. The Multi-wave switched coil unit, which can be supplied in three types, solves the difficulty of covering a wave-band extending from 13.5 to 1,900 metres, without coil changing. Type No. 960 is provided with three windings which cover five wave ranges. The Crossfeeder block aerial system is described and illustrated on page 13. Use of the Crossfeeder blocks enables a doublet type aerial and the Crossfeeder system of lead-in to be employed. This arrangement greatly reduces interference from man-made static which, in so many cases, seriously interferes with weak short-wave signals. Every short-wave enthusiast should make sure of securing a copy of this comprehensive and useful catalogue. 231

Mazda Valve Booklet

VALVE booklets should always form part of the constructor's file as they invariably contain much useful information. The new Mazda booklet is no exception as it deals with valves and their circuits in a manner so comprehensive as to render it invaluable to every radio enthusiast. Full technical details of all their various types are given, while in most cases useful hints and tips regarding operation and suitable circuits are mentioned. 232

Varley Products

THE new thirty-two page catalogue of Varley's will be found most useful. It is generously illustrated and devoted to a detailed description of the many products produced by this firm. A whole heap of information is given regarding iron-cored coils, their design and application. The latest permeability tuner is discussed in detail and the two pages devoted to it form very interesting reading. Every conceivable form of output circuit seems to be catered for according to the description

Continental Radio News

Continued from page 688

last few days? The power of the transmitter has been raised to 100 kilowatts to bring it on a par with the others. A further relay in Eastern Germany is to be installed near Niederlaussitz.

High Power for Brussels?

Although no definite confirmation is obtainable, rumour hath it again that the Belgian authorities have decided to replace the Velthem stations by two 100-kilowatt transmitters for the broadcast of the Brussels No. 1 and No. 2 programmes.

This greatly increased power would obviate the installation of a third station in the eastern part of the country, as had previously been planned.

Considering that the kingdom of Belgium is only about as large as Yorkshire, I think you will agree that two 100-kilowatts ought to suffice.

of the many output transformers and chokes, while mains equipment also receives its fair share of publicity. 233

New Short-wave Components

THE rapidly growing band of short-wave fans will appreciate the latest details of the Mycalex components, produced by Wright and Weaire, Ltd., the manufacturers of the famous Wearite products. 234

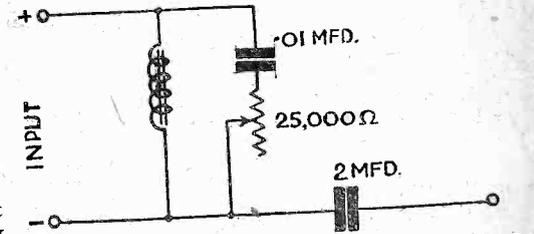
Controlling the Tone

Continued from page 683

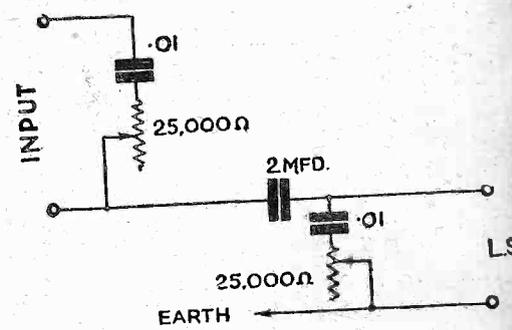
existing loud-speaker across the input terminals—even though it may be only a balanced-armature unit. Don't forget though that this will act as a very inefficient choke if the current passing through it is at all high.

As a final note, people have asked us how to cut out some of the bass, or "boom." It is quite easy, this, although we haven't done it. Take out the .01-microfarad condenser and put in its place a 3-henry tapel choke. That will by-pass the low frequencies and so cut down the bass and/or "boom."

Some of our friends use this to cut out mains hum; for by cutting out 50-cycle frequencies you cut out the hum of that frequency—obviously.



Circuit of choke-capacity and tone-control unit



Circuit of dual tone-control unit

Copies Wanted

WE are particularly anxious to get hold of two copies each of the following issues of AMATEUR WIRELESS, which are right out of print:—

- No. 554 ... dated January 21, 1933.
- No. 560 ... " March 4, 1933.
- No. 569 ... " May 6, 1933.
- No. 570 ... " May 13, 1933.
- No. 591 ... " October 7, 1933.
- No. 607 ... " January 27, 1934.
- No. 612 ... " March 3, 1934.

Readers who have spare copies of these issues are invited to communicate with the Editor. Sixpence each will be paid for copies accepted—but please do not send us any copies until we have accepted your offer.

Next Week

Making a Trickle Charger

Amateur Wireless INFORMATION BUREAU COUPON Available until Saturday, JANUARY 5, 1935 FEE 1/-

FULL DETAILS of ENGLISH PROGRAMMES

from - -

LUXEMBOURG

1,304 metres

PARIS (Poste Parisien)

312.8 metres

NORMANDY

206 metres



A FEW OF THE GOOD THINGS IN FRIDAY'S ISSUE (DEC. 28) The Visitors' Book—another of A. J. ALAN'S remarkable stories told in his usual inimitable manner. Full page portrait of the STREET SINGER. A visit to the home of MARIUS B. WINTER. Description of the Midland Regional studios. "My New Year resolutions for the B.B.C." by GODFREY WINN. Two pages of pictures on broadcasting the New Year Watch Night. Etc., etc., etc.

Every week RADIO PICTORIAL devotes seven pages in giving full details of the English-speaking programmes from Continental stations for the coming week.

These programmes are exclusive to RADIO PICTORIAL.

RADIO PICTORIAL always contains forty pages revealing in pictures and in words the latest news and gossip about radio stars and well-known personalities of the microphone.



LISTEN TO THE "RADIO PICTORIAL" CONCERTS FROM RADIO NORMANDY AND PARIS (POSTE PARISIEN).

Full details of Programmes, etc., in the current issue.

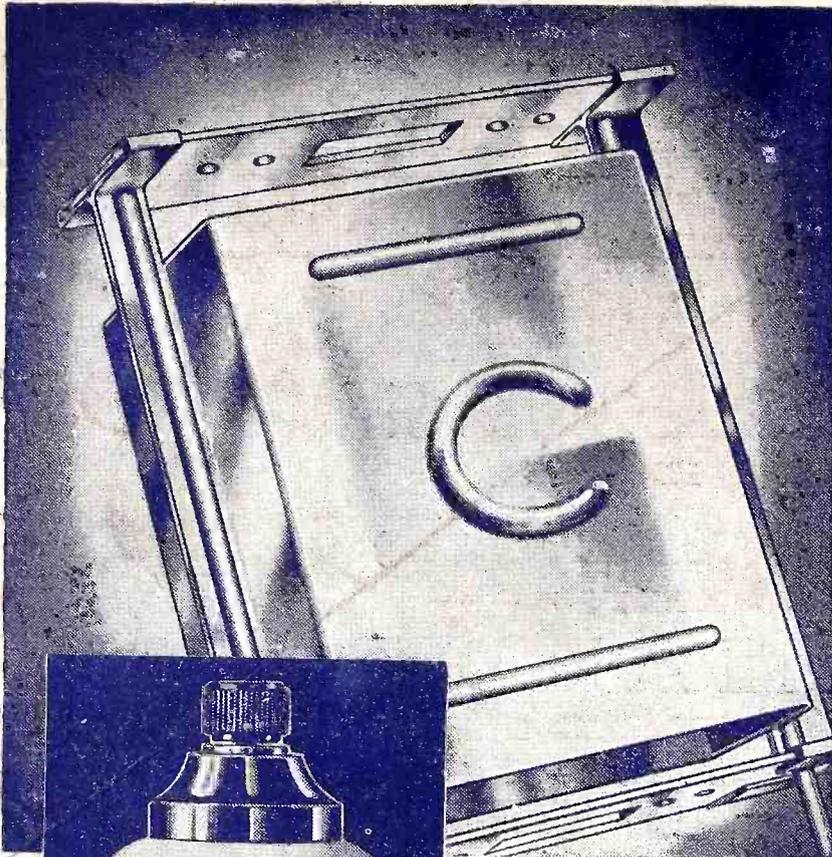
RADIO PICTORIAL

Of All Newsagents, every Friday—PRICE THREEPENCE

Build the De-luxe

D.C. THREE

IT is a common complaint of those unfortunates who are still on D.C. mains that their interests are not catered for by radio designers. The "De-luxe D.C. Three" is an engineer's idea of what an up-to-date D.C. set should be. The *Wireless Magazine* were so impressed by its fine performance that details of it have been published in full in the December *Wireless Magazine*. If you are still on D.C. mains then the set described is just the thing for you. You'll find plenty of other fine articles in the *Wireless Magazine*, December issue. Get a copy to-day, price 1s.



ANODES—built and assembled with Microscopic Precision



KINGS OF THE AIR

COSSOR

for **UNIFORMITY**

Absolute uniformity of characteristics, unvarying consistency in performance and life-long dependability are ensured in all Cossor Valves. Strict adherence to laboratory principles—laboratory accuracy, stage-by-stage methods of checking and the use of the Cossor Mica Bridge all contribute to the fact that every Cossor Valve is true to rated characteristics, and capable of outstanding performance.

To A. C. COSSOR LTD., Melody Dept., Highbury Grove, London, N.5
Please send me free of charge, a copy of the Cossor 40-page Wireless Book.

Name

Address

A.W. 29/12/34.

B.V.34.

FREE! NEW WIRELESS BOOK

A 40-page book packed with useful and interesting information—latest circuits—technical terms—how a 'super' works, etc. Send now.

PLEASE USE THIS COUPON . . .