FUSE LORE by PERCY HARRIS :: CAN YOUR COILS?

Amateur Wireless and Radiovision

3d Every Wednesday

WHEN YOUR SUPPLY IS CHANGED TO A.C.

A REMARKABLE TUNING DIAL

EUROPE'S PLANS FOR 1935

AMPLIFIER HINTS AND TIPS

HOW TO GET REAL QUALITY with THREE VALVES

Vol. XXVI. No. 657. Registered at G.P.O. as a newspaper. January 12, 1935

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Radiovision Editor: H. CORBISHLEY

Amateur Wireless and Radiovision

Editor: D. SISSON RELPH
Assistant Editor: ALAN HUNTER

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News and Gossip of the Week

Another Howler

SOME of the lay press has been frothing over the supposed cure-all transmission system said to be sponsored by the B.B.C.

As usual, they have got hold of the wrong end of the stick. The single-sideband system of transmission certainly has commercial possibilities—but not in countries where broadcasting is already highly developed.

—And Why

EASY enough to see why. If single-sideband transmission were introduced, all the sets in the land would be obsolete, for such a system requires a special type of receiving apparatus.

The B.B.C. is merely pursuing a policy of exploration as laid down at the last Lisbon international technical conference.

It would be the last to imagine that it had up its capacious sleeve a ready-made solution to wavelength crowding.

Beautiful Theory

SUPPOSING for a moment that broadcasting were only just beginning in this country, as it probably is in a few backward parts of the world.

Then would be the time to try out this single-sideband idea, which in effect means that two programmes can be sent out in the carrier space at present occupied by one.

At the same time there are snags even in this. Quality of reproduction is said by some to suffer from high-note attenuation when single sideband working is attempted.

Abnormal Behaviour

THAT mysterious ether canopy the Kennelly Heaviside layer is still misbehaving itself, according to experts who should know.

What a grand excuse this is for the failure of the Droitwich National!

Especially as tests seem to be proving beyond reasonable doubt that other long-wave stations are suffering in exactly the same way as Droitwich is—from the bane of distortion and short-distance fading.

Another Attempt?

NOTHING will be done at the B.B.C. about Droitwich until the alleged seasonal effect has had time to wear itself out. And until other stations on the long waves report an end of the layer's misbehaving.

Meanwhile, though, the engineers are busily thinking out ways and means of improving the Droitwich radiation. A new aerial is more than likely.

Taping It Up

TO Brittania, about 9 miles from Ottawa, Canada, the B.B.C. is sending a Blättnerphone tape machine.

This will be used to bottle programmes received by the Canadians from B.B.C. and other short-wave stations.

At suitable times, these bottled programmes will be re-radiated through the medium-wave Canadian stations.

Special Station

FOR this and other such work a £2,000 receiving station has been erected at Brittania—increasing evidence of the tendency to poach on other preserves in order to give a spot of variety to the programmes.

For many years the B.B.C. has, of course, had a Listening Post at Tatsfield, where short-wave signals are picked up for re-broadcast, in addition to an enormous amount of routine wavelength checking on the medium waves.

Reorganisation

FROM the beginning of the New Year a certain amount of re-organisation has taken place in the engineering departments of the B.B.C.

Work has been split up into two distinct sections. The first for transmitting and the second for studios and offices.

Each section of division is controlled by a superintendent engineer—Mr. Hotine for transmitting, and Mr. Andrews for studios.

Better for North

FORMERLY the engineering was divided into North and South sections, with a "super" for each. The new line-up is therefore interesting.

Injured Arthur Row and Billy Hall of the famous 'Spurs team were able to enjoy the Christmas programmes in a nursing home. They certainly look perky enough with their Ekco superhet, don't they?

It means that provincial stations can look forward to keeping better pace with technical improvements introduced from the London station.

Microphone Lag

TWELVE months ago, it may be recalled, only London had a chance to try out new-type microphones, while the provincial centres had to stick to their standard equipment.

In this and other ways there is now every hope that development work will be co-ordinated so that all stations progress together. Which is very much as it should be.

Balance and Control

ANOTHER important change has been effected in the Balance and Control section. Each engineer engaged in this vital link between studio and transmitter will in future be a specialist.

Those dealing with variety broadcasts will be embraced in the Variety Department, and similarly the Music Department will take over its own specialising B. and C. men.

Very Important

IT would be hard to over-estimate the importance of these men. They virtually wed art to the machine—and upon their understanding depends in large measure the aesthetic pleasure of millions of listeners.

Gramophone Records

WHILE the B.B.C. is still negotiating with the gramophone recording interests, the old agreement for the broadcasting of records is being adhered to. Actually, though, it expired at the end of 1934.

We gather that Phonographic Performance, Ltd., is asking for substantial payment for record broadcasts—but whether they will get it is not yet decided.

Who Benefits?

WHEN you come to think about the matter, the record interests have probably more to gain in publicity from broadcasting than the B.B.C. has to gain in broadcasting material.

The B.B.C., of all broadcasters, makes comparatively small use of records as such—although many of its programmes are bottled on the spot for Empire consumption.

Can Your Coils ?

By PETER SHIPLEY

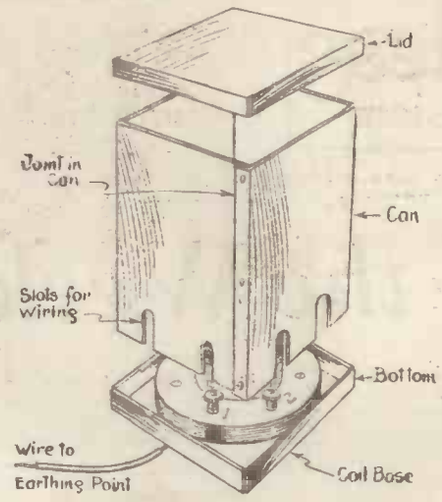


Fig. 4.—Completed can. It should be noted that the bottom piece is fixed underneath the coil base, with a wire gripped underneath for earthing to the chassis

"CAN my coils *what?*" I can imagine the more ingenuous of my vast readerage riposting. I don't mean it that way, actually.

You know all about the girl whom, by the way that she moves the thermometer, proves that she certainly can—can? Well, this has nothing to do with her, either.

Brass—or Iron—Tacks

Coming down to the nauseatingly proverbial brass tacks—most of us use iron tacks, anyway!—I want to tell you this week how to fool around with canning.

It all started with corned (bully to you!) beef. When the genius canned beef he started a wave of canning that now embraces practically everything except old boot leather. Coils, mortal and immortal, have not escaped.

To come back to the title, let's explain that to begin with. Can your coils? Should you—or not? A theoretical question that frankly I am not prepared to try to handle—partly because I hold certain rather heretical views on the subject, but more particularly because, well, this isn't meant to be a theory article.

All I am trying to do is to tell you something about the four pretty pictures that, as a result of diligent work at the local night school, I have been able to produce all for your delight.

Let us assume you have some perfectly good coils that need canning—need this because they are being placed somewhat near each other, with consequent danger of magnetic coupling, interaction, and instability.

The first point to settle is the size of the cans. They must be of such a diameter that at least half an inch separates the outside of the coil from the inside of the can. If the cans come any closer than this they will cause severe damping and loss of efficiency.

Truth to tell, you can increase the air space between coil and can quite considerably, but after an inch there is not much point—the effect of the metal on the coil decreasing rapidly with distance.

Circular or square ?

Next you must decide whether you want circular cans or square ones. Let me tell you this: the square ones are the easier to make. I know, because I've tried my hand at both. Admittedly the square can does not look quite so professional as the circular can—but who *wants* to be professional, anyway?

I for one am not obsessed with the necessity for competing with, much less imitating, the worthy factory wallahs.

Let's take a look at Fig. 1, which gives you the drop on a square can. Note the first point of importance—the gauge of metal. No. 22 aluminium or copper—the first being easier to work and, I believe, cheaper to buy.

I will leave you to work out the dimensions, because they depend so utterly on the coils you want to can. See that you leave a good ¼-in. flap at one end, as this will be needed to fix the subsequent square.

Three holes should be drilled in this flap, suitable to take either 8BA screws and bolts or rivets. Do this bit of work with studied care, as a lot depends on it for success. The actual bending of the sides is easy, especially if you bend the metal on a good stout wooden block.

Now for the top and the bottom. I have arranged these two bits so that they fit snugly on the outside of the can, with flaps bent up to grip without any screws or rivets.

The dimensions of the squares for top and bottom should be the outside width of the can plus two thicknesses of the metal, to allow for the bending upwards.

Having cut out the three pieces of metal for the coil and bent the main piece to shape, you can fix things good and proper with the bolts. These are easier for the lay hand than rivets, though I find it easy to work with bits of aluminium wire as rivets.

As I say, though, the bolts are the simpler, and I should stick to them if you are a 'prentice hand.

Not So Easy to Make

Turning now to Fig. 2, we have all the dope on a circular can. Not so easy to make, by any means, but well within the capabilities of all you horny-handed hams, I'm sure.

Same gauge stuff as before—aluminium or copper. Same flap requirement at one end for the overlap. You can bend the cut piece of metal round a jam jar or cocoa tin, either of which will serve as a former.

The top and bottom pieces are, perhaps, a bit fiddling, as you have very carefully to cut serrations round them in order to bend up outside the circular can. Again, about ⅛ in. overlap will do. The more serrations you make in the circles the better tops and bottoms they will become.

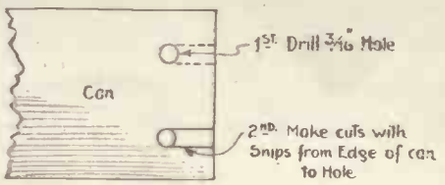


Fig. 3.—Follow this method for making neat slots in cans for the wiring connections

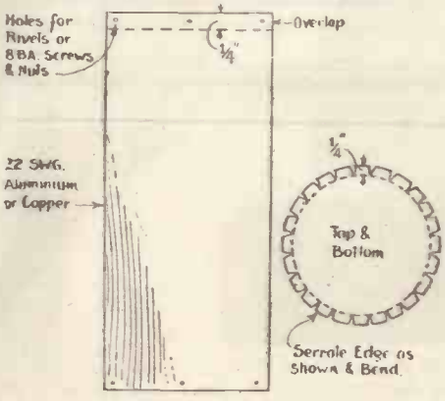


Fig. 2.—Layout of metal for circular can—the top and bottom being separate pieces

Slots in the Can

Passing on to Fig. 3, we come to the slots in the cans for the connections. A ¼-in. hole drilled ½ in. or so up the can will act as a start. The slot can then be cut out with snips or the scissors of the lady of the house. Don't let her know, though.

Fig. 4 is virtually the *piece de resistance*—what "The Experimenters" would characteristically refer to as the milk in the cocoanut.

It shows a completed can of the square type, with the method of jointing for the four sides clearly shown also. The lid is drawn perhaps a little too good to be true, but it is at least something to aim at.

When you come to fix such a can in a set you will have first to take up the coil base and screw the fixing bolts through the can into the baseboard. Remember when you are doing this to fix the bared end of a connection underneath one side of the base of the can. This will effectively enough give you an earthing contact without the bother of a separate terminal.

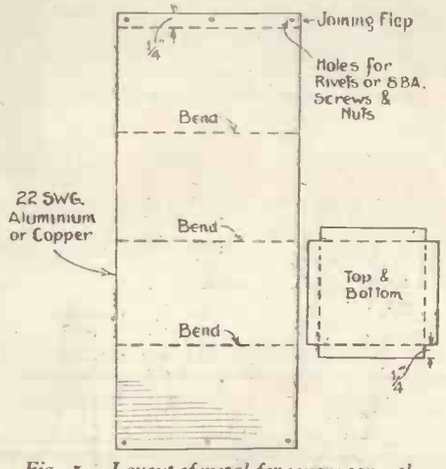


Fig. 1.—Layout of metal for square can—the top and bottom being separate pieces

On some sets there will be a metallised baseboard, or even a metal chassis, in which case the base of the can will automatically be earthed as it is fixed.

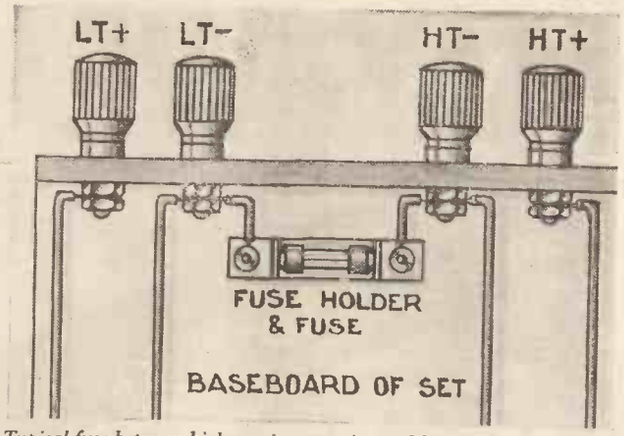
Lots of fun can be enjoyed with this canning business. There is some genuine researching still to be done to determine the right kind of cans for different kinds of coils.

All kinds of high-frequency hook-ups become possible when you can the coils, hook-ups that would be mere shrieks of oscillations with uncanned coils.

P.S.—Even my initials are in the nature of an afterthought.

Fuse Lore

By PERCY W. HARRIS, M.Inst.Rad.E.



Typical fuse between high-tension negative and low-tension negative —fitted inside the set

EVERY commercial mains set, some commercial battery sets, and a certain number of amateur-built receivers incorporate fuses, yet these useful little devices are seldom mentioned or their particular technique explained. Seeing that the most expensive fuse is cheaper than the least expensive valves and as, furthermore, if one valve blows several others may go at the same time, a little chat about fuses may be useful.

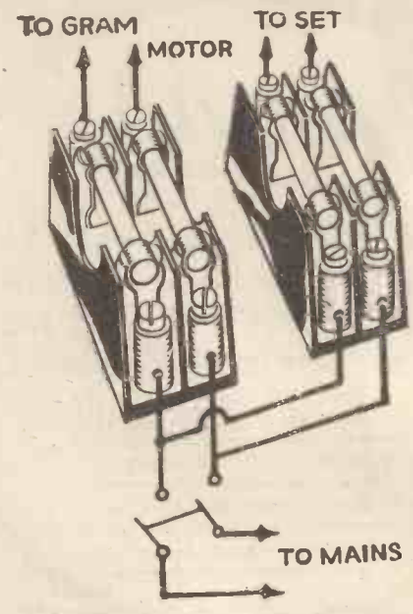
A fuse as used in a wireless set is simply a short length of fusable material placed in any path along which a dangerous excess of current may come and cause trouble. In a mains set that path is obviously the lead from the nearest light or power plug from which we draw the power to operate the set. In a battery set our possible source of danger is the high tension battery.

In the Aerial Lead

It might be thought that a fuse in the aerial lead would be helpful in case the aerial should be struck by lightning. One could assume that in the event of lightning hitting the aerial the fuse would melt, thus disconnecting the set, but those who understand lightning discharges (and this does *not* include the majority of those who design lightning switches for wireless receivers!) know quite well that the discharge is so intense that the comparatively short gap offered by the blowing of a fuse would not deter lightning from reaching the set, the flash simply jumping the intervening gap.

Incidentally for the same reason I hold the view that a great majority of aerial switches which are supposed to protect the set from lightning discharges are perfectly useless. However, our discussion relates to fuses in the set.

There are several kinds of fuses provided in wireless sets, the chief being the flash-lamp bulb type, the cartridge type and the special gold type. So far as the mains sets are concerned the fuses are similar to those provided in house lighting and blow when the current is much in excess of the complete requirements of the set, which may consume 60 to 100 watts.



Twin fuses arranged for motor and set of a radio-gramophone on the instrument side of the mains-input switch

We are not really concerned with valve filaments blowing in mains sets because there is no filament as such, but merely a heater carrying at least one ampere and placed inside a tube which is coated with the electron-emitting material. Furthermore, the heaters are not in the case of A.C. sets connected directly to mains but work through a transformer. A breakdown in the set might in some circumstances cause a short circuit, arcing or undue heating which, in turn, might cause the set to catch alight, so a fuse in the mains is a very practical safeguard.

In the case of battery sets, however, we must remember that the high-tension supply circuit has a direct metallic connection to the filament circuit and there are several possibilities of valve filament burn-out due to misplaced connections arising either from wrongful construction in the case of a home-constructed set or a wire becoming loose and touching another in a later stage.

Look at Fig. 1, (page 26). The current path is from the high-tension battery, through the load (which may be the primary of a transformer, a choke or what-not) from the plate through the grid mesh of the filament and down to the negative of the battery. That is, following the old convention that the current goes from positive to negative.

The electron flow is from negative to positive —but let that pass—we are only concerned with the path of the current, not the direction. Now you will notice that if we short-circuit the load nothing serious will happen because of the comparatively high internal resistance of the valve in the path, and the current could not rise to a very high figure.

We could theoretically even short-circuit the valve internally without damaging the filament, provided the short-circuit comes on the negative side of the filament, although of course the effect will be to damage the high-tension battery. But if we make a short-circuit from anywhere above the positive terminal of the high-tension battery to the positive side (as shown by the dotted line), then practically the whole voltage of the high-tension battery may be thrown on the filament and it will fuse in a flash. You will also find on examination of most battery set circuits, that all the filaments are in parallel and they may all blow at once.

Sometimes, however, a short-circuit may occur without the valves blowing because there may be a very high resistance, such as the coupling resistance, in the path, and this will limit the current flowing and keep it below the figure at which the valves will blow.

If, for example, there is a 100,000-ohms resistance as the load and the battery is 100 volts, then the maximum current that can flow in the circuit including the dotted line will be only one milliampere, which will do damage to nothing. Again, after an accident of the kind to which we have referred, the valves may be still alight, having survived the surge of current if it is only a momentary one, but the set may be very much "off colour" owing to the emission of the valves having been damaged by the excess of current.

A fuse is highly desirable in all these circumstances and may even stop an otherwise dangerous fire. I have known a case where a new high-tension battery has been short-circuited inside a set and has actually set it on fire.

The Ideal Fuse

The next point we have to consider is that any old fuse will not do in a battery set. The ideal fuse will blow when the current in it exceeds to any measureable degree the normal high-tension requirements of the set, but it is not practicable to work to such close figures and it is advisable to aim at one which blows before the current reaches that which will damage the valve filament—say 100 milli-amperes.

This brings me to another point of considerable interest and one which has given much difficulty to home constructors. I have known many cases where a set has been made up as shown in Fig. 2, with a fuse between high-tension negative and low-tension negative and a 2-microfarad condenser connected between high-tension positive and low-tension negative. A good fuse has been chosen to blow at about 100 milliamperes and it has gone every time the set has been switched on—actually directly the high-tension battery has been connected up, and the poor home constructor has spent hours trying to find the fault.

Charging Up the Condenser

The reason is that, with a connection of this kind, immediately the high-tension battery is connected up it charges the 2-microfarad fixed condenser, and the initial rush of current to charge this condenser is more than sufficient to blow the fuse, if it is a good one. The substitution of a fuse which does not blow in these circumstances is not curing the trouble, but merely substituting an inefficient device for an efficient one. The good fuses *should* blow in such circumstances and the trouble is that the condenser is wrongly connected.

The wire A should be removed from the position shown and joined directly to high tension negative, whereupon the fuse will only blow by an excess of current taken by the set. If the fixed condenser should break down the fuse will not protect the high-tension battery in such circumstances.

I have known cases where the introduction of a fuse into a set has made it unstable, and while this may at first seem a surprising fact, you will understand it when you consider that a fuse must have an appreciable resistance otherwise it would not heat up with the small current which will blow it.

Continued on page 26

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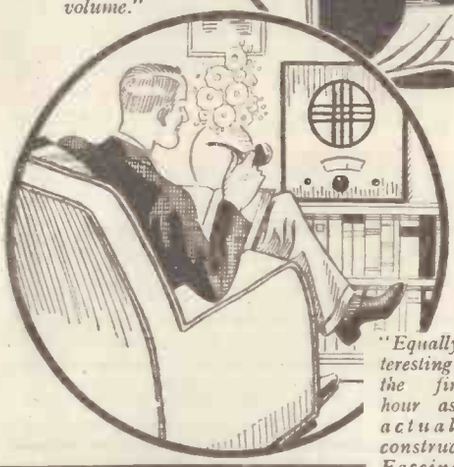

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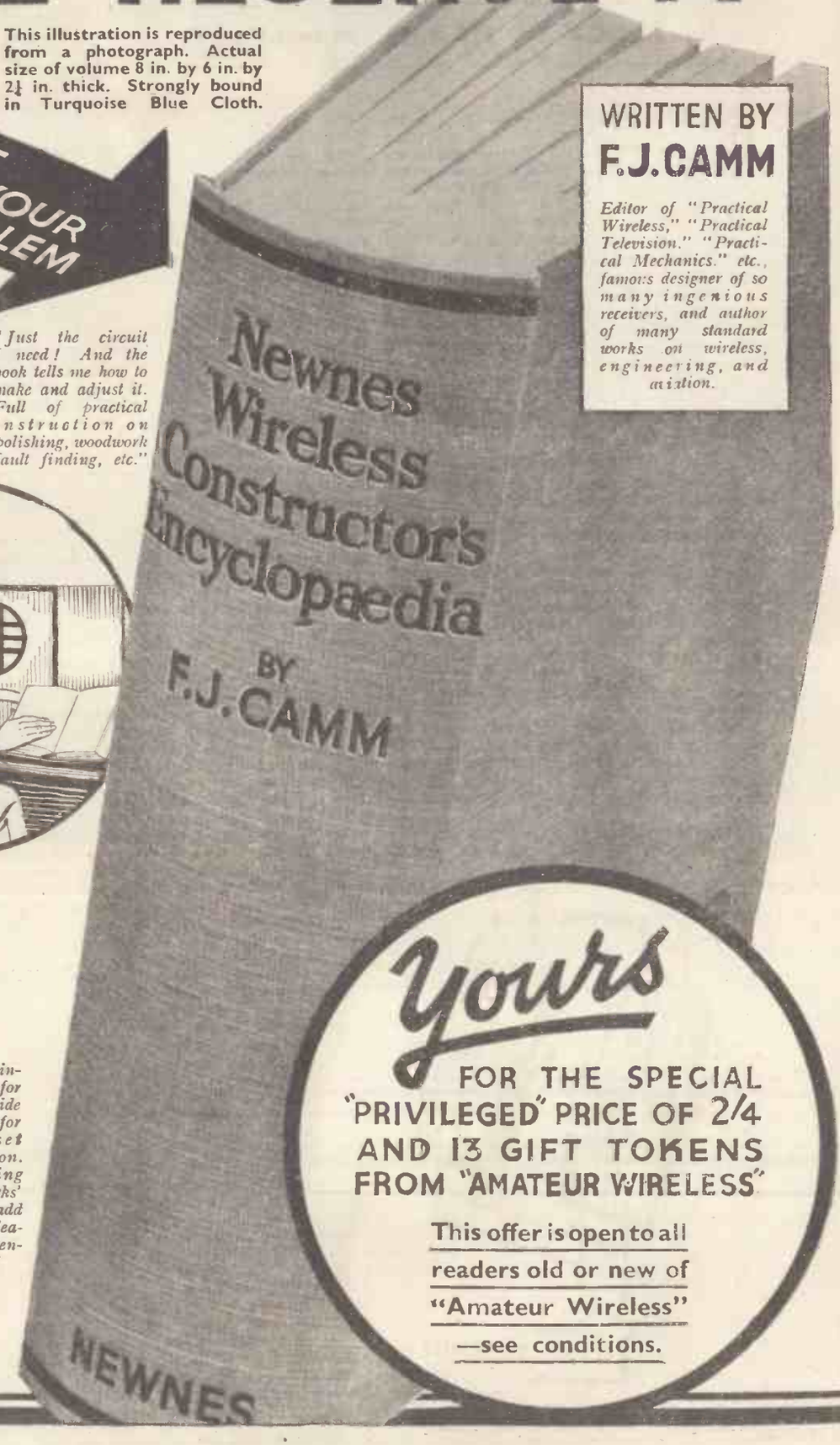

WRITTEN BY
F.J.CAMM

Editor of "Practical Wireless," "Practical Television," "Practical Mechanics," etc., famous designer of so many ingenious receivers, and author of many standard works on wireless, engineering, and aviation.

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A Remarkable Dial

ON the Continent there are many strange things in these days and not the least unusual is the tuning dial for the A.E.G. superhets. "Alphabetischen Stationswahler," the correct designation, may be translated as "Alphabetical station selector," and that is exactly what it is.

Referring to our illustration, the "moving finger" is the white cross-bar of the longitudinal central slot, operation being from the central knob on the set front.

It will be seen that the names of nearly 100 medium-wave stations and twenty-four long-wavers are arranged above and below the central slot, in columns which are lettered A, B, C, etc. Each column has numbers 1, 2, 3, 4, 5, to agree with the stations in that group.

Thumb-operated Index

At the left side of the dial is a thumb-operated index which carries all the stations on its drums and exposes a few at the small rectangular window adjoining.

In the position shown, assuming that the upper columns are illuminated, the white indicator is pointing to column F number 3. Turning the index drum shows that F3 is Frankfurt.

As the indicator moves along the central slot and stations come in, each in turn can be checked up on the index drum, or if one wishes to select any particular station, the key number can be found on the drum and the indicator set to agree, before switching on. No doubt it is easier to operate than to describe.

Changing from A.C. to D.C.

By Our Legal Correspondent

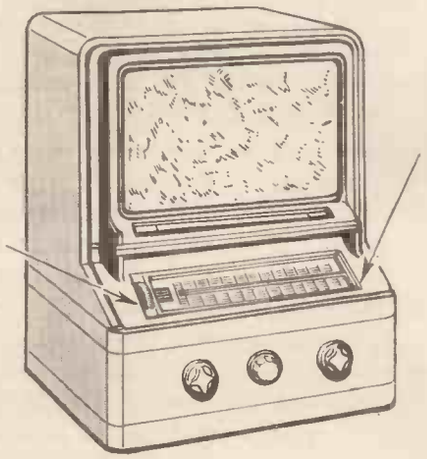
WHEN a supply company changes over from direct to alternating current its customers are given no choice in the matter. But they very naturally object to being put to any considerable expense by the change.

In the ordinary way, it is laid down that "the company shall *at their own expense* carry out the necessary alterations to their customers' existing apparatus to suit the altered system and pressure of the supply; or pay to each customer injuriously affected by the alteration such sum as may be agreed upon; or, in default of agreement, such sum as may be determined by arbitration."

Official Body

These words are quoted from the regulations issued by the Electricity Commissioners, who are the official body responsible for the public supply of electricity.

There is a proviso to the effect that "where notice of the coming change has been given by the company to their customers—not less than one month and not more than six months in advance—then the company shall not be liable in respect of any new apparatus



installed by the customer during that period."

All this seems very clear and straightforward. But when a customer who has installed a D.C. wireless set applies to the supply company to have it converted for A.C. working, he does not always find it such plain sailing.

In many cases the company are willing to meet the liability, particularly if they have accepted the wireless set as part of the "scheduled" electrical apparatus on the customer's mains. In other cases they may offer to go fifty-fifty with the customer in the cost of conversion. But in a few cases they calmly refuse to shoulder any of the burden.

If a customer has formally notified the company that he is installing a mains-driven set, and does so before the company tells him that they intend to change over from D.C. to A.C., then according to the strict letter of the law the company is bound by the regulations of the Electricity Commissioners.

But there are certain things about a wireless set which places it in a class apart from the ordinary run of mains-driven apparatus. In the first place it takes a very small load from the mains, so that in this respect it does not bring much grist to the mill of the company. Again, the cost of converting a set from D.C. to A.C. is heavy compared with whatever profit the company is likely to get from it as a current consumer.

Finally, it is a fact that when the Electricity Supply Acts were first passed the all-mains wireless set was not in existence, and it may be argued that the regulations previously quoted were only intended to apply to apparatus which takes a heavy current and is therefore a source of profit to the supply company.

On the other hand, the mains-driven wireless set is worth far more to the supply company than the current it consumes. Lamps and electric stoves, for instance, are being used during those hours in the evening when the family is sitting up, perhaps later than they otherwise would, to listen to the broadcast programmes.

Also, the total current taken by some thousands of sets is very welcome to the company during the afternoon hours, when the normal domestic load on the generating station falls off.

Most important of all "wireless from the mains" has given the electric supply companies a tremendous "boost" so far as the domestic consumer is concerned. It has brought electricity into thousands of new homes; and once there, other electrically-driven gadgets rapidly follow suit.

The more far-sighted companies therefore encourage the use of mains-driven sets, and are prepared to shoulder the expense of conversion, if and when the necessity arises. The others are simply being "penny wise and pound foolish" when they refuse to give the wireless listener a fair deal.

Fuse Lore—*Continued from page 23*

Particularly in badly designed sets, the additional resistance introduced by the fuse is sometimes sufficient, being a common connection, to give undesirable feed-back effect. In a properly designed set with adequate decoupling this should not occur, and there is really no excuse for it nowadays.

If a Fuse Should Blow

If a fuse should blow, do not insert a new one until you have tracked out the cause of the trouble, otherwise in nine cases out of ten the second fuse will blow and you may be left without one for the time being. A fuse does not blow just by chance, and the fact that it has blown is an indication that the current has exceeded the proper value by many times.

Frequent causes of fuses blowing are attempts to adjust a component in the set by means of a metal screwdriver while the current is on, resulting in short-circuit, or some metallic object may drop inside the set when the lid is open.

Many people think that if a battery set is switched off by means of the on-and-off switch that they can make internal adjustments without risk, but it should be remembered that the high-tension battery is *always* connected even when the low-tension battery is switched off, so always disconnect the high-tension battery before starting any adjustments.

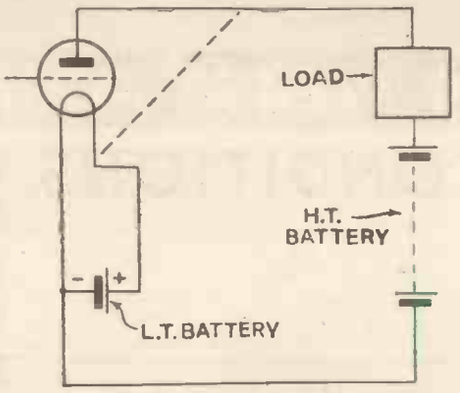


Fig. 1. Simple circuit showing current path in a valve circuit—following, it should be noted, the old convention

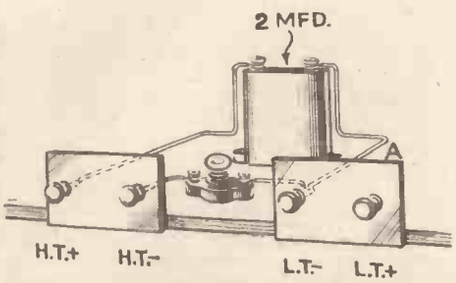


Fig. 2. Sometimes this fuse arrangement will "blow" every time the set is switched on, as explained in the article

On Your Wavelength

The Week's Radio Gossip :: By THERMION

What of 1935?

FOR many years past I have tried to gaze into the future during January and to see what the ensuing twelve months are likely to bring forth in the way of wireless developments.

Frankly, I expect nothing very startling in 1935. By this I do not mean that there won't be many big discoveries or inventions; I think that there will, but few of them are likely to reach during the year the commercial stage of development.

What we shall see is quiet, steady progress in receiving-set design and performance. The superheterodyne will still further increase its popularity at the expense of the straight set, particularly in the all-mains types.

One reason for holding this belief is that the difference in cost between an A.C.-mains super-het and an A.C.-mains three- or four-valve "straight" is now so small. Unless the set is wanted for receiving the local station only the extra pound or two spent on the super-het is very well worth while.

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Coming Valve Developments

VALVE prices will probably be reduced again towards the end of the summer, though I don't think that the reductions will be big. Nor do I anticipate the introduction of any outstanding new types amongst either mains or battery valves.

I do hope, though, that valve-makers and set-makers will co-operate in the design of battery sets with a view to keeping high-tension current consumption within reasonable bounds.

Economy in high-tension current is a matter of immense importance, particularly in the high-frequency or intermediate-frequency stages of a battery set, and it is a matter that is calling urgently for attention.

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Cold-emitter Valve

THOUGH I don't think that the cold-emitter valve will appear on the market this year, there is no doubt that its development has reached a point that is almost beyond the laboratory stage. Cold-emitters have, in fact, been used for commercial working in extended tests.

The cold-emitter is completely different in almost every way from valves as we know them to-day. It has no grid, it has two cathodes, the plate is in the form of a ring, and the bulb is surrounded by a solenoid winding through which a steady current is passed to form a guiding field for the electrons which speed from cathode to cathode through the plate.

The valve runs absolutely cold, and once the energised solenoid has been replaced, as no doubt it will be, by a permanent magnet, operation should be most economical.

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Receiving Sets

THE super-hets of 1935 won't differ enormously from those of last year, though I expect we shall see more of the "all-wave" set, taking in wavelengths from, say, 12 to 80, 200 to 500, and 1,000 to 2,000 metres. Self-adjusting volume control will be a standard fitment and considerable improvements are likely in S.A.V.C.

In the past, not all S.A.V.C. systems have been genuinely worthy of the name: some of them come into action too early, some too late. And there are other snags, too, which will doubtless be removed. I expect to see a good deal more attention paid to the quality of reproduction and the high-fidelity principle may be developed to some extent.

The A.C.-D.C. type of receiving set should make further strides, and I trust that manufacturers will bear in mind that there are still (and must be for a long time) some seven million homes in which battery sets are the only kind that can be used satisfactorily.

H.M.V. photo

Peggy Cochrane, the well-known B.B.C. vocalist, recording with Jack Jackson's popular dance band

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Advertising and Wireless

THOUGH there is no doubt that the sponsoring of broadcast programmes by advertisers can lead to a particularly high level of entertainment—some of America's leading radio stars receive as much as £1,000 for a single turn—there is equally no doubt that advertising if overdone soon sickens the listener.

In two parts of the world protests against excessive advertising have become so strong that action is to be taken. The French Government has decided that there shall be no advertising from any of the State-owned stations in France, and the Canadian broadcasting authorities are arranging to relay more and more of the mother country's programmes.

In Canada, the National and Regional programmes will have to be "potted" by means of the Blättnerphone and transmitted some hours after they are received, for Canada is so vast that there is a time difference of no less than five hours between her most easterly and most westerly parts.

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B.B.C.'s Letter Bag

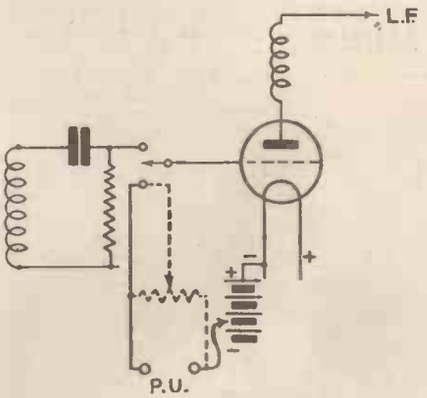
DURING the past year the people at Broadcasting House have dealt with 150,000 letters of appreciation or the reverse from listeners.

H.M.V. photo

This ingenious conveyor is used at the Hayes factories to transport timber from the barges running through the works to the timber yards

"A.W." Reference Sheet—No. 15

Pick-up Connections



Typical pick-up connections

WHILE most commercial receivers are provided with the necessary sockets or terminals for pick-up connections, there are still quite a number in use, particularly home-constructed receivers, where no provision has been made.

Now that electrical recording is so widely employed, it is a great advantage to employ a pick-up to obtain faithful reproduction. It is an easy matter to adopt most circuits, the main consideration being the volume required.

It is usual to feed the output of the pick-up into the grid circuit of the detector valve except where the low-frequency portion of the receiver is capable of giving great magnification. In this case the input is taken to one of the low-frequency valves.

It is safe to assume a peak value of 1 volt for the output of the average pick-up. Therefore, bearing in mind the amplification factor of the valve or valves and of the couplings, it will be appreciated that the output valve must be capable of handling quite a large input if no distortion is to be experienced.

The diagram shows the most simple method of connecting a pick-up in the detector circuit, the dotted portion being a potentiometer which acts as a volume control and which, if not already embodied in the pick-up unit, should be so arranged that it forms an accessible control.

It is essential that all leads should be kept as short as possible, and it may be found necessary, in some circuits, to use the metallised braiding for screening purposes. It will be noted that one side of the pick-up is taken to the negative side of the grid-bias battery, the actual value required depending upon the pick-up and the associated valve.

The switch should be of the low-capacity type, otherwise it is quite possible that radio transmissions will be heard.

And now the B.B.C. is able to hit back by voicing its particular grouse. Far too many of the letters contain just destructive criticism. In other words, they condemn without suggesting how improvements can be made.

If you have a grievance, by all means write to the B.B.C. Tell them why you don't like the items that you criticise and offer suggestions for something better. Remember that anonymous letters are consigned to the wastepaper basket—the proper destination of all anonymous letters—and that blustering threats to "give up wireless" unless something or other is done don't cut any ice.

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"One-more-valve Complex"

SO far as my experience of listeners goes—and it is a pretty considerable one—it seems to show that no possessor of a straight set containing less than five valves is ever satisfied that it wouldn't be better if he could add just one more.

You know how it comes about. With a two-valver you hear quite a few stations, but there are many that you just can't get up to loud-speaker strength. Ah, how easy they would be were there but one more valve!

With a three-valver there are many more loud-speaker stations, but again there are a few which just can't be worked up to the desired strength. And so the urge goes on.

Heaps of people that I know have completely ruined two- or three-valvers by imagining that the addition of that "one more" is just a matter of a condenser, a coil, and a valve holder if it is of the high-frequency variety, or a transformer and a valve holder if an extension of the low-frequency side is required.

You *may* be lucky. You *may* find that by building an extra stage into your set you don't upset things and do obtain results up to expectations.

But the odds are that what was once a well-mannered set, giving good reproduction, becomes a squealing, distorting, uncontrollable horror whose performances cause you earnestly to wish that you hadn't.

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How to Add On

IF you want to increase the number of your valves, there is only one method that I have ever found satisfactory. This is *not* to try to pack another stage into the cabinet, but to build a separate unit, housed in a box of its own, outside the set altogether.

In a recent issue of AMATEUR WIRELESS a particularly good "add-on" high-frequency unit was described, and in the great majority of cases you will find that it gives your set greatly increased range and a much bigger repertoire of stations.

What those who try to make "improvements" or additions in the set itself won't realise is that the designer, when he worked out the set originally, meant it to be a two-valver or a three-valver, as the case may be, and chose his circuit, his components, and the layout accordingly. That is why alterations, unless they are very carefully and skilfully made, seldom result in business as usual.

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Listener's Progress

SWEDEN has a most interesting wireless paper, *Radiolyssnaren*, whose title means, as you may have guessed already, *The Wireless Listener*. That " en " at the end is the " the "—the Swedes do it that way.

I was vastly amused by a series of drawings in a recent issue which tell the story of ten years' listening. Here's how the captions read:

1924, Started to be Interested in Wireless. 1925, Started Listening on a crystal. 1926, No Complaints About Crystal. 1927, Made a Valve Set. 1928, Built First Loud-speaker. 1929, Built Second Loud-speaker. 1930, Built Real Loud-speaker. 1931, Acquired Portable. 1932, Became an All-mains Enthusiast. 1933, Acquired Radiogram. 1934, Acquired a Receiving Licence.

As somebody (whose name is so familiar that for the moment it escapes me) once remarked: "Many a true word is spoken in jest."

Now, then, pirates!

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Radio Skull and Crossbones

TALKING about pirates reminds me of some figures that Sir Kingsley Wood, the Postmaster-General, gave the other night when he was the guest of honour at some function, which was again so frightfully important that for the moment I cannot remember just *what* it was. Anyhow, you can take it from me that it was a pretty posh show.

We have reached, as his figures show, the six-and-a-half-million mark and there have been pretty fat increases in receiving licences during the past couple of months. He also said that every day there are some half-dozen or more successful prosecutions of those who use receiving sets without going through first of all the little formality of taking out a licence.

Unless he is so hard up that he has literally not two halfpence to rub together (though why anyone should want to rub halfpence together, or swing a cat or possess the brains of a rabbit I never could make out), I cannot understand how anybody should jib at taking out a wireless receiving licence.

And the queer part is that most of the prosecutions that take place *aren't* of people who are down on their uppers. The average pirate can perfectly well afford to plank down his ten bob, but just won't do so.

Pirates might remember with advantage that the rest of us are paying for their entertainment, and the fellow who is mean enough to let other people do this is a queer sort of creature; he is on a par with the chappie who has his 1934 poppy dry-cleaned for use on next year's Poppy Day.

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Is Foreign Listening Worth While?

IF you want the answer to that question, just put the tuning dial of your set to zero and turn slowly upwards at any time after about 4.30 p.m. At the very bottom of the medium waveband you will hear quite a lot of nasty noises, but soon you will come across a station which is giving something light, bright, and really entertaining.

Run over the medium waveband critically, and I think that you will agree that there's simply a mass of entertainment waiting in the ether for anyone who cares to capture it.

That's my experience, anyhow, and I think that anyone who does indulge in regular or occasional trips abroad cannot help feeling the same way about it. Whatever your outlook, there is always something from foreign stations that fits in. Perhaps you used to know one or two foreign languages which threaten to become rusty through disuse. You can keep them polished bright by listening to talks or news bulletins from France, Germany, Italy, Holland, Sweden, or half a score of other European stations.

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Plenty of Choice

YOU want light music? You can find it in two ticks of the dial. Or, if you would like to hear opera or a Brahms concerto there is sure to be some station ready to oblige.

Dance music? You won't have to go far to find it. Singing? Orchestral concerts? Popular concerts? Plays? The stirring music of the Cigany Band? Instrumental solos? Gramophone records? Or the most modern of modern musical compositions? Whatever may be your fancy, the modern sensitive and selective set enables you to find something to suit it in a matter of moments.

And you don't just hear faint distorted sounds. Full loud-speaker strength from a couple of dozen stations is at your command at any time after dusk.

Is foreign listening worth while?

Very definitely it is.

Europe's Plans for 1935

By J. GODCHAUX ABRAHAMS

CONSIDERABLE activity on the radio front during the past year will lead to the completion of a number of new stations which should take over their duties in the earlier months of 1935. Not only has the construction of new transmitters been planned by most European states, but those already in existence, although recently built, will see their power raised.

Throughout the World

Each country in turn has endeavoured to make its voice heard throughout the Western Hemisphere and, in addition, in order to increase the range, most nations have installed short-wave transmitters so that their broadcasts may be heard by their nationals throughout the world.

Next year, without doubt, promises to be an exceptional one as regards the development of the broadcasting systems both in the Old and New Worlds; if all the proposed schemes mature, the twirling of a condenser dial will bring to our ears radio entertainments not only from most European cities and towns, but also from far more distant localities overseas.

Latest statistics show that there are at present 1,398 broadcasting stations in the world; of these, 282 are located in Europe and 949 in the American Continents. The aggregate power is roughly 9,200 kilowatts.

In the United Kingdom our interest obviously is concentrated chiefly on what is taking place in the neighbouring countries on the Continental mainland, as it is mostly from this source that we draw our foreign programmes.

French Reorganisation

France, perhaps, is the country which, in 1935, will have shown the greatest changes. Her broadcasting system, with the exception of some half-dozen stations, is now state-owned, and its reorganisation will offer many advantages not only to the French but also to the British listener.

The Poste National, Radio Paris, will blossom out as a 150-kilowatter or of an equal power to Droitwich; P.T.T. Paris, at Villebon, near the French capital, will be in possession of a 120-kilowatt station which should be operating in March; and a transmitter of the same type will be installed at Toulouse-Muret very shortly.

In the spring it is hoped to get the Lyon-Tramoyes 100-kilowatter working, as well as the 60-kilowatt broadcasting plant now being erected at Lille-Camphin. Rennes P.T.T., whilst awaiting the completion of its new transmitter at Thourie, has recently raised its power to 40 kilowatts.

The state station at Nice-La Brague (60 kilowatts) is well on the way and should be testing by the end of March; the regional transmitter at Marseille-Realtor is expected to take on its duties by the end of July or August; Bordeaux and Strasbourg P.T.T. may also see their energy raised to something approaching 60 kilowatts.

As to the north coast of Africa, the 12-kilowatt Algiers transmitter is considered inadequate, and the French authorities, realising that listeners in the home country are interested in Colonial life, have now expressed their willingness to assist Radio Alger in installing a 100-kilowatt station. Radio Maroc may also follow this example next year.

Germany during 1934 had been steadily improving and enlarging her radio network. Already most of the reconstruction "according to plan" has taken place, but there still remains to be built a new Deutschlandsender (150 kilowatts), a bigger station to feed the Frankfurt-am-Main groups and a chain of smaller relays to cover the country.

Gulliland photo

Third, fourth and fifth stages of the Berlin 100-kilowatt transmitter which works on a wavelength of 356.7 metres

Spain, which for some years, owing to the unsettled state of the country, has lagged behind its neighbours, had hoped to put its house in order last year. Unfortunately, recent political troubles have indefinitely postponed the carrying out of a settled scheme, and it is doubtful whether 1935 will see the plan mature.

There is, however, a possibility that we may see in the course of this year the opening of a high-power national transmitter at Madrid; possibly also, another station at Barcelona, but much more than this is doubtful.

In Jugo-Slavia many changes are taking place, and we may expect to find Belgrade more frequently in our log. The present station will shortly make way for a 50-kilowatter, and 6-kilowatt relays are to be installed at Skoplje and at Serajevo.

The little Zagreb station which has done such yeoman service will be transferred to Split (Spalato) and the Croatian district of the country will be given a 20-kilowatt transmitter.

Roumania will shortly launch her new 150-kilowatt station at Brasov; it is the smaller one now in use which you hear in the background of Kootwijk and Huizen. For Bucarest, a 20-kilowatter has been ordered to broadcast the national programmes.

The network which the authorities propose to set up will include four more regional stations to be erected at Chisinau (Bessarabio), Cernauti (Bucovina), Cluj (Transylvania) and at Timisoara; they will be aided and abetted by a string of small relays.

Even little Belgium contemplates a reconstruction of her twin stations at Velthem (Louvain) to bring them on a par with their hefty neighbours.

Switzerland has already offered us stronger signals from Beromuenster; she is now overhauling and adding to the Sottens plant to boost up its output.

In Scandinavia

Norway, having successfully started the new 20-kilowatt Trondelag (Trondheim) station on its way, is finishing off Vadso (10 kilowatts) and also tackling Bergen's new transmitter.

Bulgaria, which so far has only operated a "toy" station at Sofia, plans something larger in the near future with relays at Varna and Plovdiv (Philippopolis). Rodno Radio, the toy transmitter in question, will be shortly replaced by a 3-kilowatt station.

The Turkish programmes from either Istanbul or Angora have been seldom picked up in the United Kingdom, but there is just a chance, if nothing unforeseen happens, that a start may be made some time in 1935 on a 150-kilowatt transmitter at Angora. Broadcasts backed by such energy should reach our shores.

Greece has made a few attempts to establish a service of radio entertainments, but barring those put out by a group of amateurs at Saloniki, the proposals have never come to anything. It is now reported that Athens may be endowed with a 50-kilowatt station in the course of the next twelve months, and that simultaneously work may be started on one of lower power at Saloniki.

Poland, as the possessor of the largest medium-wave station, is considering additions to her broadcasting system. The 20-kilowatt Torun station, due to work in March or April, will be followed by a high-power transmitter at Cracow —possibly over 100 kilowatts, which would permit, if necessary, the

Continued on page 33

Gulliland photo

Foot of the aerial mast of the high-power broadcaster at Bisamberg (Vienna). Note the counterpoise wires anchored to the concrete base

AMPLIFIER HINTS and TIPS

By The

HERE we are again—turning up in the centre pages like bad pennies. Three readers asked last week if we had been fired. Oi!

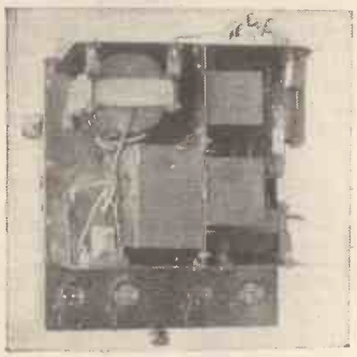
This week we are going to talk about amplification—some secrets and snags we have come across in the course of our chequered careers.

Wrapped up with this amplification business is always the question of quality, or, looking at the other way round, distortion.

Take, as an example of how theory can often be entirely contradicted by a little actual experience, the Fig. 1 circuit, which shows a resistance-capacity-coupled low-frequency-amplifier circuit for battery operation.

Left out for clearness, among other things, is the grid-bias connection—all we want to show are the fundamentals.

Our A.C. amplifier, with an output of 11 watts



Note the mains transformer has all its connections through the bottom of the case

In this circuit you will see that there is a little query circling the coupling condenser between the anode of the first valve and the grid of the second.

Do you know, actually, how to find out which is the right value for the condenser's capacity and the resistance value of the anode resistance? We do, but what's the use of giving you a formula? You will only shudder and turn to lighter meat.

Instead we will hand you the dirt as it has affected us. Take the anode resistance, for a start. Instead of wading through the Calculus, remember that this should be roughly three times the impedance of the valve.

Anticipating Aunt Alice

Yes, but how do you find the valve impedance? Anticipating this come-back from Aunt Alice of C-cum-H, we remind you that every valve maker provides a nice little piece of paper giving full data, including the impedance of the valve.

Then the condenser. Its value *is* a bit tricky. Trial and error is as good as most formulae, but as a start .1 microfarad is sound. If you want more bass, run up to .5 microfarad—or for less bass go down to .05 microfarad.

To some extent the anode resistance and coupling condenser values are inter-related, but the amateur—that's you!—won't go far wrong if a valve of 25,000-ohms impedance is used with a resistance of 75,000 ohms, together with a .1-microfarad condenser. An amplifier of this kind will handle approximately 1 volt from a pick-up. If you are using an antiquated pick-up giving a colossal voltage output, don't forget the input volume control.

With Auto Transformer Coupling

With transformer coupling forget all we said about resistance-capacity coupling—especially when you come to choose the value of that coupling condenser.

Here's why. If you increase the capacity to give more bass you may succeed in decreasing it. Take a look at Fig. 2, which shows a parallel-fed transformer-coupled circuit. Instead of having a resistance as the anode impedance there is a choke, which, in addition to keeping up the quality avoids a big drop in the high-tension voltage on the anode.

Speech currents are fed into the grid of the following valve through what boils down to an acceptor or tuned circuit, comprising the coupling condenser and the primary of the transformer.

It is more than likely that if you put in a 1-microfarad coupling condenser there would be a distinct falling off in the bass. With an AF5 transformer and a .1-microfarad condenser, for example, the bass output given with a typical amplifier was 30. By decreasing the capacity of the condenser to .05 microfarad the output of audible bass increased to 45.

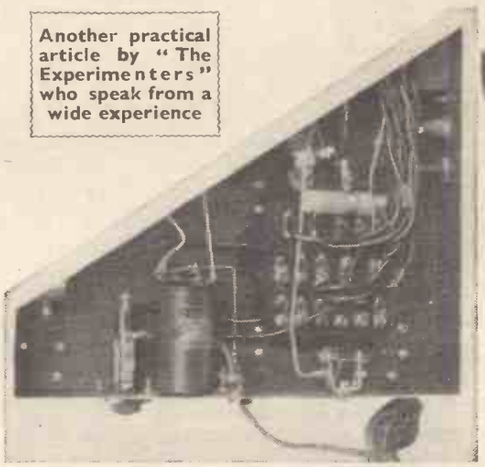
What happened was that the acceptor circuit tuned to more or less the optimum frequency response, and the peaking was definitely lowered by the larger condenser capacity. Remember this, then, when you think of increasing the bass of a parallel-fed arrangement.

One other point about Fig. 2. The high-frequency choke is not a good stopper unless the high-frequency current can be by-passed to earth through a condenser. Often enough this vital part of the filter is omitted.

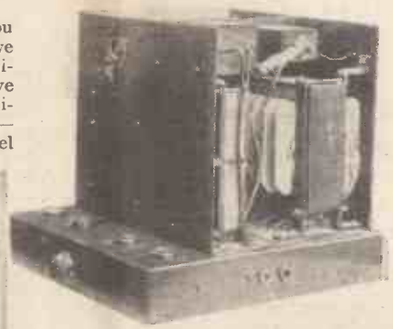
Now we will let you all into a secret. Something tells us that the variable-mu pentode's life is drawing to an untimely end. After all the ballyhoo about this valve, we are amused to find that different settings of the variable-mu control introduced serious distortion.

In Fig. 3 you will see how we now use a variable-mu valve to give maximum quality—with a novel form of input volume control to avoid variation of the grid bias.

Another practical article by "The Experimenters" who speak from a wide experience



Here the transformer connections are clearly seen, with semi-variable bias resistance above it



See how the power pack is kept to one side in the A.C.-mains amplifier, with division across the centre of the can

A fixed degree of grid bias has been introduced, widening the grid base to accept the highest desirable input without distortion. As a general rule 1½ volts input bias will prevent overloading from all but the local station.

For a really drastic control you can put in a differential-reaction condenser across the aerial and earth terminals, with the rotor going to the aerial lead-in wire. We can guarantee that this circuit will give almost complete freedom from distortion, with quite good control of volume when handling both strong and weak signals.

Incidentally, this form of volume control is completely noiseless—and there is very little possibility of putting out the ganging because the loading across the coil is constant. Another point is that the control can be used equally well on battery and mains sets.

Not long ago we had to help a fellah to rig up an amplifier. He made up what to us seemed a reasonably simple three-stage affair. He had ample high-tension—about 170 volts. The best of components. And yet the quality—oh, dear! 'Twas awful.

At Fig. 4 you will see his circuit—or rather nearly his circuit, for it includes a little alteration. The trouble was that his grid bias was all wrong, so were his component values, and lastly his valves.

What He Stood Us

When we had put these things right the quality was as good as he had dared to hope for—and he stood us, well, that doesn't really matter just now.

Looking at Fig. 4, the input valve first claims attention. Here we suggest an HI. type, with impedance of 15,000 ohms. Anode resistance 45,000

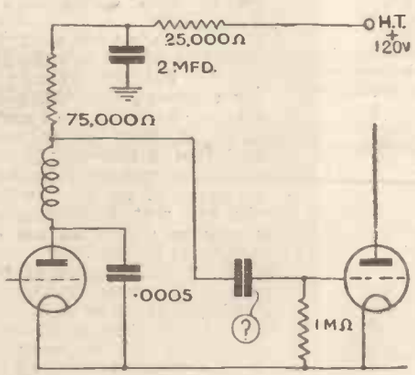


Fig. 1. Suggested resistance-capacity-coupled circuit with critical coupling condenser

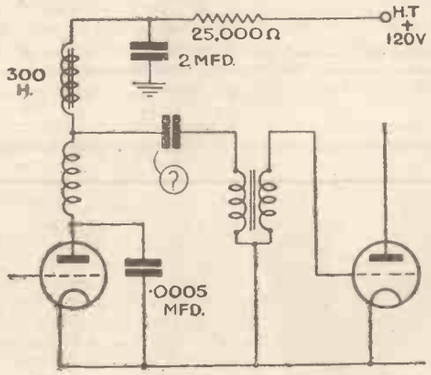


Fig. 2. Don't forget that when using a parallel-fed transformer a big condenser does not always mean more bass

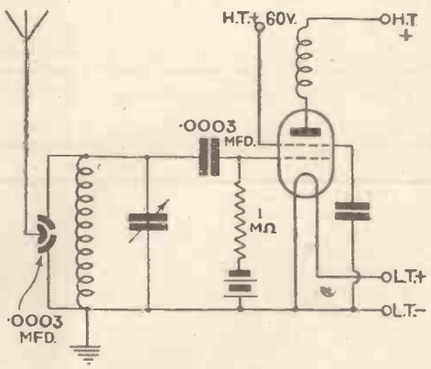


Fig. 3. This is how we are now using variable-mu screen-grid valves. Note the differential volume control

Experimenters

ohms—as stipulated already. A decoupling resistance of 10,000 ohms just to add to the fun.

De-coupling

Then a decoupling condenser between the anode of the HL valve and the first low-frequency valve, with a capacity of .1 microfarad. Our pal had used another HL in this stage—obviously wrong, because of overloading troubles. He had tried an LF valve without much improvement. We put in a small power valve, taking 10 milliamperes. An impedance of 5,000 ohms.

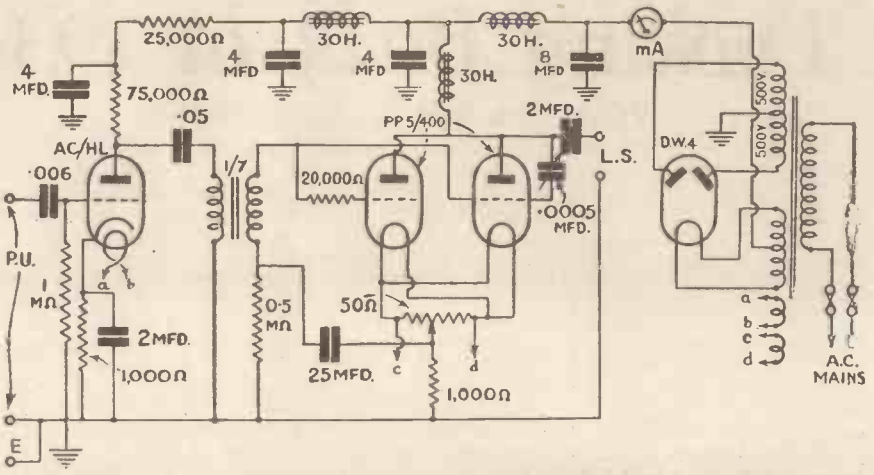


Fig. 5. Circuit of our A.C. amplifier, very simple considering it gives an output of 11 watts

Normally we should have needed an anode resistance for this valve of 15,000 ohms, meaning a drop of 150 volts. As we had only 170 available this was no go. So, instead we used a 300-henry low-frequency choke, having just the desired effect with a resistance of only 1,000 ohms—dropping therefore only 10 volts.

We didn't really need any decoupling in this stage, but just to make sure we put in a resistance of 2,500 ohms.

The coupling condenser in the second stage should have been a .1 microfarad again, but actual trial showed that this gave just a little too much bass, so nothing loath we reduced to .05-microfarad capacity.

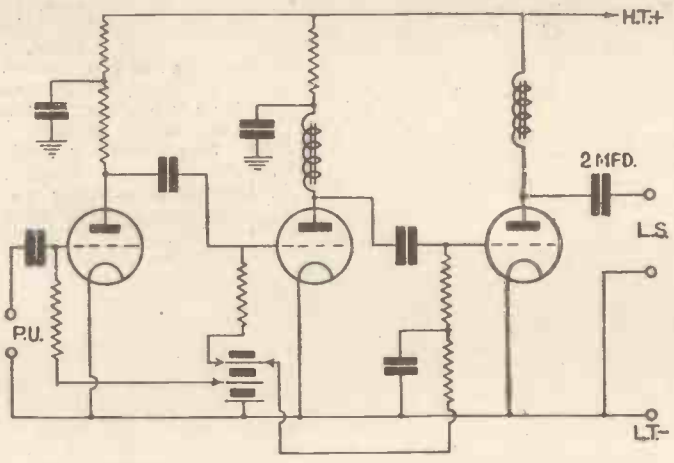


Fig. 4. Battery-operated amplifier, the main values for which are given in the article

You will see in the grid of the second stage that we have two resistances instead of the usual one. We noticed that with long pick-up leads and a rather duff battery there was a low-frequency rumble—so we decoupled the grid circuit in the same way as the anode, using a 1-megohm grid leak and a .1-megohm decoupling resistance.

That is about all for the circuit. The output valve was a super-power type, using a choke-filter circuit to protect the loud-speaker winding. This choke, by the way, has to have a low resistance, because we are passing 23 milliamperes. We dug up one with an inductance of 30 henries at that current, and a D.C. resistance of only 210 ohms.

Now for just a few bars on our little pet amplifier. We have an 11-watt A.C. amplifier—and yet it is only a two-stager. Truly!

As you can see from the circuit, we have an ordinary triode input valve, which is coupled to a pair of PP5/400 valves in parallel through a 1-to-7 ratio low-frequency transformer.

How High-tension is Provided

High tension is provided by a transformer giving 500 volts through a valve rectifier—100 volts more than we really want for the anodes. After the drop in voltage through the smoothing chokes, the excess is knocked down by 10 volts, and the whole of the excess is used up for the 90-volt grid bias for the output valves. You will see that both anodes and grids are decoupled. Bias is automatically applied, through a cathode resistance in the first stage and through a resistance between the chassis and the pot across the filaments in the second stage.

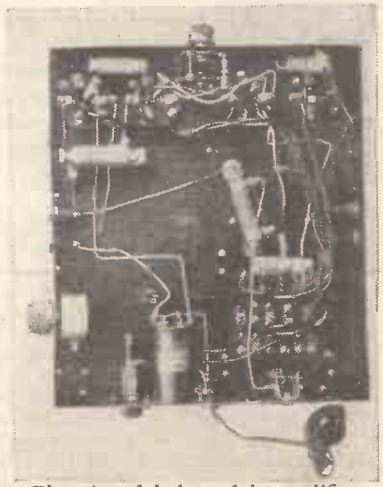
The entire unit is housed in a metal container, so that there is nothing external except the four valves and the tone control. You can see this control by the knob at the front. It is actually a .0005-microfarad mica-dielectric type connected between the grid and anode of the output valves.

Amplifier Input and Output

This amplifier, as we said, will give you 11 watts output. It will do it with an input of 1.5 volts R.M.S.—about the output of a Marconiphone pick-up. With one of the latest needle armature pick-ups giving, say, .25 volts you will want an input transformer to give with a step-up ratio of 1-to-6 in order to keep up the final output.

If you couple this to a radio set you may get chronic distortion because very likely the output from the detector valve will be several volts. You can soon overcome this trouble by a pot across the input, regulating the voltage down to 1.5 volts.

The amplifier is easily handled, as only the tone-control knob projects when the job is assembled



Plan view of the base of the amplifier. Bottom left you see the input volume control for cutting down on radio

Looking Back at 1934

What the B.B.C. Accomplished

DEFINITELY a successful year. No complaints as to quantity, at all events. The transmission hours amounted to 63,109 hours, 20 minutes. So that if you heard everything, you heard it at the rate of 5½ days' continuous broadcasting for a farthing. Or looking at it more reasonably (the above includes *every* programme *all* the time) it works out about a farthing a day.

The year marks the installation of the new transmitter at Droitwich—no mean achievement; the new stations for the North Scottish and North-East Regionals will, presumably, be the work of 1935. It is just a year since the Lucerne Plan came into operation.

A 1934 Story

The Empire Service is a 1934 story. Great improvements have been made quite recently in the programmes. If you have friends in remote parts of the Empire you can rest assured they are being looked after.

There have been some notable broadcasts, too. Empire Day from Australia; the Livingstone Memorial ceremony from the Victoria Falls, Central Africa; the London-Melbourne air race; and the Christmas Day programmes.

Other relays, nearer home, come to the mind. The launching of the *Queen Mary* and the Royal Wedding, for example. Also the King's broadcasts.

Then there have been the running commentaries on various international football, matches; test matches, tennis championships race meetings, boxing contests, and the Oxford and Cambridge boat-race. The B.B.C. has done us well over sports.

Relays of opera make a good show. They are much appreciated by a certain class of listener. From Covent Garden there have been ten relays; from Sadler's Wells and the Old Vic combined, thirteen. The Royal Carl Rosa Opera Company have to be included; five operas by them have been relayed, so that, in all, there have been relays of scenes from twenty-eight operas, averaging roughly one a fortnight. That is not overdoing it considering the public is relatively small; on the other hand it is not meagre.

Henry Hall's Guest Nights have been very popular. He has been an excellent host, having entertained at least 130 artists, many of whom faced a microphone for the first time. It will be remembered he was included in the Royal Command Performance at the Palladium, and also that he fulfilled a week's engagement there.

Many Notable Conductors

Turning back to the more serious side of music again, there have been fourteen Symphony Concerts with many notable conductors. Sir Thomas Beecham, Bruno Walter, Stravinsky, Sir Henry Wood, and Dr. Boult are among them.

Artists such as Schnabel, Lamond, Petri, Prokofiev, Casals, and Myra Hess have to be mentioned.

Also there were the concerts in the Festival last May. Three were conducted by Boult, two by Bruno Walter, and one by Weingartner. Carl Flesch and Backhaus appeared, also Horowitz.

The public Chamber Concerts were continued and brought forth some famous quartets. As for the Proms, the forty-nine concerts broke all records for popularity in the forty years' history of these unique concerts.

In all there were more than five hundred orchestral concerts during the year, a record of which the B.B.C. may be justly proud. Something definite has been done for good music.

Less successful have been the organ recitals, perhaps, but there have been some good players.

Now for the spoken word. "Whither Britain?" caused a good deal of interest. The speakers I can call to mind were H. G. Wells, Winston Churchill, Lloyd George, and Bernard Shaw. There have been talks on foreign affairs including three trans-Atlantic debates; also two National Lectures during the year.

The public has been kept in touch with outstanding events such as the state of the country during the drought last summer.

Perhaps one of the greatest moves has been the development of broadcast drama. There have been sixty-five full-length plays, including nine Shakespeare productions, from the studio. Also there have been ten short plays given.

The Drama Department has handled various anniversary programmes such as the inauguration of Summer Time, the tenth anniversary of Imperial Airways, Whit Monday, the 400th anniversary of the Dominion of Canada, the twentieth of the outbreak of the War.

Then, again, an experiment was tried with a reconstruction of a famous historical trial. Peter Creswell's magnificent production of the trial of Charles the First created deep interest.

There have been some very successful adaptations. Ibsen's *Ghosts*, Tchekov's *Seagull* and *Ivanov*; Galsworthy's *Loyalties* and *Skin Game*; Dickens' *Oliver Twist*; Brontë's *Wuthering Heights*; Philpotts's *Mr. Pim*; Milne's *Wild Decembers*.

Distinguished actors such as Milton Rosmer, Godfrey Tearle, Sir Nigel Playfair, Charles Laughton, Irene Vanbrugh, Haidée Wright, Cyril Maude, Leon Quartermaine, Peggy Ashcroft, and Sir Philip Ben Greet have all appeared before the microphone during the year.

As for variety, there has certainly been plenty of it. It is enough to mention the establishment of successful titles such as *In Town To-night, Dancing Through, Café Colette, Songs from the Films, Scrapbook, A Tune a Minute, First Time Here, Château de Madrid, Soft Lights and Sweet Music, Best Sellers, Guest Nights, Guess Who it is*, and the *Air-do-Wells*. It is a good list. Not all are equal in quality, but good entertainment.

The light entertainment for the year has also included a good deal of broadcast comedy. Amongst musical plays specially written for broadcasting have been *Meet the Prince, Big Business, Playing the Game, Honeymoon in Paris, Love Needs a Waltz, Puritan Lullaby, Charing Cross Road, The Silver Patrol, Away to the Hills, Invitation to the Waltz*, and *The Show Goes Over*.

Amongst the stage successes adapted for the microphone have been *The Arcadians, Floradora, Wonder Bar, Wild Violets, Show Boat, A Cousin from Nowhere, The Girl Friend, Autumn Manœuvres, The Lilac Domino, Monsieur Beaucaire, Our Miss Gibbs*, and *The Gypsy Baron*.

In the Religion Department there have been several interesting developments. *Pilgrim's Way* and the delightful "Melodies of Christendom" have each been given on one Sunday in the month between nine and half past.

Two new courses of lectures were begun in the autumn: "The Way to God," a series of connected lectures on Christian faith and practice, and "The New Christendom" given on Sunday afternoons. The definite religious quality about the Sunday programmes has been strictly maintained.

There have been a hundred and fifty thousand letters of appreciation and criticism delivered at Broadcasting House during the past year.

W.-W.

Listeners' Letters

Droitwich Fading

To the Editor, AMATEUR WIRELESS,

SEEING the other day in "A.W." that some people were complaining about Droitwich fading around the 250-mile limit, I have written to tell you that quite lately I have experienced quite a lot of fading from Droitwich. Thinking it was my set that was the matter, I overhauled it, and, to my surprise, Droitwich was still faint, and usually on my set it comes in very loud.

The Christmas number of "A.W." was great, especially "Radio Tricks for that Christmas Party." The Goodwill sets are good, too, and I am glad to see in the Goodwill Three (battery transportable) that, although it has no baseboard, it does not go as far as a chassis, but has a metal baseplate.

THOMAS O'DEA.

Limerick, I.F.S. [1173

Receiver Breakdowns

INTERESTING comment upon breakdown of certain receivers is of importance, and has a decided bearing upon the increase of hire purchase.

I have met a considerable number of buyers under the heading specified who could well afford to pay cash, but state they had no intention, as under hire purchase any receiver was readily righted, whereas if cash was paid in full delays arose.

However, on the matter of breakdowns I have two particular cases in mind and blame price-cutting entirely.

One purchaser paid cash on spot for a £15 15s.—A.C. mains receiver which had a mains transformer go inside of a month. This was replaced after some long delay, and within six weeks the replacement is failing and far from satisfactory, and is being returned for adjustment.

My four-valve radiogram (exclusive of cabinet but inclusive of meters and extra pick-up and volume control) contains a retail value of £43 for components. No trouble exists here, as all components are the best types made by firms who guarantee tested supplies. The whole is constructed so that a novice could reach any component for test in two minutes.

[HERBERT HART.

Bath. [1174

"A.W.'s" First Crystal Set

I HAD occasion yesterday to clear out my cupboard of spare "junk," and there, dull and thick with the dust of years, hidden behind more modern and comparatively bright condensers, chokes, transformers and other components of to-day, forlorn and forgotten, I found my first AMATEUR WIRELESS Crystal Set.

Do you remember the first, or was it the second, issue of "A.W." when the instructions for making this set were detailed?

My thoughts flew back over the years, and again I felt the thrill experienced when I gazed at my first attempt to build a wireless set.

Full of curiosity, I blew away the dust of years, and hurried to connect up aerial, earth, and headphones—the original phones, also.

The old crystal was still in place, so once again I carefully adjusted it, and to my great amazement and joy, as clear, if not clearer, than of old, came the voice in the phones, giving "weather and news."

S. S. EDWARDS.

Sutton Coldfield. [1175

With the Short-wave Amateurs

By KENNETH JOWERS

IF your short-wave receiver uses a very small tuning condenser, round about 50-micro-microfarads, you are likely to come unstuck with your calibrations if you change the detector valve. It is quite a common complaint for an amateur to have a carefully calibrated receiver and after he has changed the detector valve for a new one to spend a considerable time recalibrating, particularly below 20 metres.

Poor Conditions

What brought this topic to mind was that one of my correspondents wrote to me to say that conditions were rather poor and he could only hear odd stations, between bands.

His last letter tells a different story. Quite a large bag of stations, particularly below 25 metres. It appears that he replaced all his valves at Christmas-time with new Cossors. Those he had before were of foreign manufacture.

Most of you probably know that Cossor valves have a very low inter-electrode capacity, consequently the dial readings for his stations increased very considerably. So much so in fact, that the 20-metre band just went off the tuning scale of his 50-micro-microfarad condenser.

As he is not used to chasing right through from 12 to 100 metres, but only tuning to the recognised bands, it took him over a fortnight to discover what was the matter.

If he had used ordinary .00025-microfarad tuning condensers, the difference would not have been noticeable, probably one degree or so. So do remember that when using a small tuning condenser, a new valve means that you will have to recalibrate.

You will gather from this that valves having a low inter-electrode capacity are preferable to those with a high capacity, for it will enable you to get down to 11 and 12 metres without any difficulty, so in future don't confine your interest in inter-electrode capacity to the screen-grid valve only. The detector is almost as important a valve in this respect.

◆ ◆ ◆

B.R.S. 1448, E. J. Wills, sends me a report from Exeter, Devon. He has received over 120 verifications from four continents since last April, and he is now only waiting for his Australian veri's to complete the bag.

Pretty Good

Amongst his verifications are some from 8W districts, also PY, VE, and almost every European country. This is pretty good from a listener who has only been on short waves for a few months.

The receiver in use is a three-valver with an untuned high-frequency stage, detector and pentode output. On Christmas morning Mr. Wills heard thirty-three amateurs on 7-megacycles and VK2ME during the afternoon.

◆ ◆ ◆

B. McDougall, writing from Glasgow, is keen on band-spreading, and wants more about it. I am afraid that the experiments I am doing at present on this topic have not yet been completed, but I really have one or two new arrangements which at the moment appear to be better than the general bandspread arrangements.

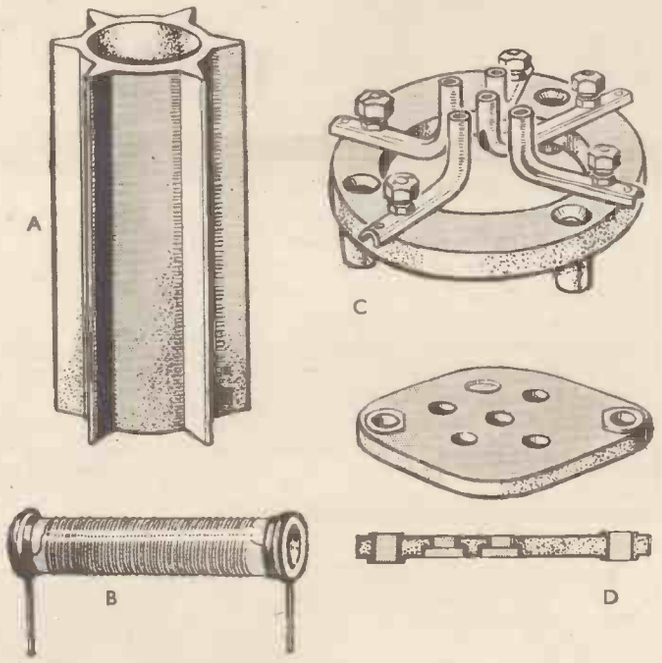
Mr. McDougall also confirmed that the 7-megacycle band is better during the latter part of the morning. Although he hears quite a large number of G stations, the signal strengths are not particularly good.

G5YJ is R3 to 4, G5CP, R5, G5XC, G6FS, G5AW, G5MG, G5ML, G6G1, all are R5/6. The most powerful stations on the band are apparently G6XR and G6OL. Both are R7. This is quite understandable in view of their locality.

W3XAL is universally well received in Scotland during the early part of the afternoon, and most readers claim continuous reception of about two hours, strength between R6 and R8.

◆ ◆ ◆

E. F. Baker, who is a very consistent short-wave listener, has written to me about the controversial point of what is the best set for short-wave reception. He sent me a circuit he uses which I wish I could publish, but, unfortunately, there isn't sufficient space.



(A) Ribbed former for short-wave coils. (B) Ultra-short-wave high-frequency choke. (C) Low-loss valve holder. (D) Component parts of chassis-mounting valve holder for short waves

Anyhow, it is a three-valver, the aerial being fed to the coil through a neutralising condenser, a leaky grid triode detector, which has the grid return going to a potentiometer. The reaction winding goes between the anode of the detector, through a radio-frequency choke to the primary of the low-frequency transformer.

Variable regeneration is obtained by means of two condensers in series between the junction of the radio-frequency choke and reaction winding and earth. One reaction condenser has a capacity of .0005-microfarad and the other .0003-microfarad.

The first stage is transformer coupled and the second stage resistance-capacity coupled. The anode resistance in the first low-frequency stage is a variable one.

◆ ◆ ◆

Martin Railton of Loughton, B.R.S. 1605, sends me an extraordinarily fine log, but mainly of C.W. stations. On 20 metres he has logged over seventy stations with an additional twenty on fone.

On 7 metres, almost one hundred stations on C.W. and twenty on fone. On 160 metres he received fone stations only and his log exceeds thirty.

Using a simple detector and one low-frequency receiver, he has logged stations from fifty countries, including F's, CT1, EA, CT2's, VP3, ZL4, CM2, ZT1, YP5, K4 and K5, YL2-5, LY1, YM4, VU2, etc. It does show that something can be done on two valves, and I am rather getting to feel that for the real D.X. work a two-valver wants a lot of beating, unless perhaps you add an untuned high-frequency stage.

◆ ◆ ◆

Bob Everard tells me that the QSL cards from the Schooner *Morrissey* will be sent out very shortly. So all those fans who have been waiting and thinking that no cards were coming can now have fresh hope.

Mr. Everard had a letter from Mrs. Clara Moe, mother of the operator of W10XDA, who says that Mr. Moe is anxious to arrange schedules with British amateurs. The most suitable time is midnight E.S.T. He goes on to say that the 20-metre band is slowly deteriorating, but the best time is between 5.30 and 6.45 p.m.

Europe's Plans for 1935—*Continued from page 29*

closing down of Katowice. Poznan, now 17 kilowatts, will be more next year.

Italy, too, is anxious to be in the front rank, and will secure alternative programmes to its listeners by building two 120-kilowatt stations in the neighbourhood of the capital. In addition, as a tribute to the great inventor, she will erect a 50-kilowatt transmitter at Bologna, to be called Radio Marconi; it should be in operation in April, 1935.

And finally, on the Baltic we find the same ambitions. In Finland the Suomen Yleis Radio, to extend its sphere, hopes to open a 120-kilowatt station at Lahti by next autumn and will transfer the 40-kilowatt plant now working there to the capital. Lithuania, dissatisfied with the 7-kilowatt plant at Kaunas, will transfer it to Klaipeda (Memel) on the coast as a relay and will invest in a 100-kilowatter for its chief city.

The perusal of the facts which have been stated in this article will clearly demonstrate that 1935 will offer a much wider range of broadcasts than the previous year. So far, I have limited my observations to European countries as space will not allow me to refer to similar developments now taking place in the United States and in some of the South American States.

Whereas in Europe, except for one Moscow transmitter, we still limit the power of our stations to 200 kilowatts, our American friends have already launched one, if not two, 500-kilowatters on the ether, and now glibly talk of further stations of the same calibre.

How to Get Quality with Three Valves

Here is an article that will interest all who are experimentally inclined. It has been specially written for "Amateur Wireless" by NOEL BONAVIA-HUNT, M.A., whose "quality" articles have been so popular in the past. Constructional details of the set suggested in these pages must be worked out to meet individual requirements; we cannot undertake to supply complete layout and wiring guides

QUALITY of reproduction from a three-valver? Is it possible? That is a question I am often asked by impecunious amateur set builders. And my answer is yes: but I must ask you not to expect the low notes to shake the floor or the double basses and drums to hit you in the solar plexus.

Besides, I take it you don't want anything like this; you just want to hear these instruments performing, and you want to hear the fundamental frequencies they give and not merely the harmonic overtones.

Low Cost—High Standard

Very well then, we shall have a shot at our "Quality Three-valver" and keep the cost of it down as low as we can without sacrificing the high standard aimed at. The only request I would make to the reader of this article is that he provides himself with a *good* loud-speaker.

As I have so often pointed out, and as every radio expert knows, the loud-speaker is the weakest link in the chain; therefore, it is penny wise and pound foolish to buy an inferior type that simply can't do even tolerable justice to the amplifier.

In this article I am only concerned with the set itself, and I hope that a great many readers will try it out and thus gain some idea of what "quality reproduction" means without spending too much on the means of getting it. A little fellow like this one may give you far greater enjoyment in your living room than a big, pretentious one that costs three or four times as much to build.

I use the word "may," as it does not necessarily follow, of course; but again and again this has been found to be the case, because big sets are often faultily designed and merely produce big volume without beauty of tone.

The complete circuit of the set is shown in Fig. 1, and I will now proceed to describe it. The aerial should, if possible, be an outdoor one, though a good indoor one will work all right in most cases. However, if an outdoor aerial is available, so much the better for results, as we can be sure of getting a good signal.

Controlling Selectivity

A series tuning condenser is incorporated in the aerial lead for the purpose of making the set selective enough when required. This can take the form of a "pre-set variable condenser" such as the Formodenser, or else a small midget variable condenser such as the Jackson can be used. The capacity should be .0003 microfarad.

The aerial coil assembly, marked L1 in the diagram, as well as that marked L2, is specially designed by the author and can be obtained all ready made up from Ohmic Accessories. It consists of both long- and medium-wave coils mounted on an ebonite platform fitted with the necessary terminals for wiring up to the double-gang tuner, and is also suitably canned.

Note that L3, L4, L5, are high-frequency chokes of any reputable make, such as the Varley Ni-core or Wearite.

It will be seen that one stage of high-frequency amplification is employed: that is to say, a screen-grid valve of the S23 or PM12 type is used, with 120 volts high tension on its anode and 60 volts on its screen. This valve is "choke coupled" to the next valve, as shown, the coupling condenser having a capacity of .0003-microfarad.

This particular value has been carefully chosen with a view to securing selectivity without loss of amplification in this stage.

Now we come to the detector. Notice that this is a multiple valve; it is a detector and low-frequency amplifier worked in one vacuum tube. The detecting part is separated from the amplifying part, so that these two functions do not interfere with one another as they most certainly do in the ordinary detector valve.

We thus gain considerably in quality results, because the rectification of signals is reasonably linear, and therefore undistorted. By using this diode - triode valve, while it may not be so easy to tune-in the weaker

COMPONENTS RECOMMENDED FOR THE QUALITY THREE-VALVER

BASEBOARD
1—Metaplex, 12 in. by 9 in.

CHOKES, HIGH-FREQUENCY
3—Varley Ni-core (or Wearite).

COILS
2—Coil assemblies (Ohmic Accessories).

CONDENSERS, FIXED
1—.0003-microfarad, mica (T.C.C. or Dubilier).
1—.01-microfarad, tubular (T.C.C. or Dubilier).
1—.1-microfarad, tubular (T.C.C. or Dubilier).
2—.001-microfarad, tubular (T.C.C. or Dubilier).

CONDENSERS, VARIABLE
1—Double-gang tuner, Polar Star Minor, with arcuate drive.
2—.0003-microfarad midget tuners (Jackson).
1—.0005-microfarad midget tuners (Jackson).

HOLDERS, VALVE
2—Benjamin 4-pin type (or W.B.).
1—Benjamin 5-pin type (or W.B.).

RESISTANCE, FIXED
1—½-megohm, 1-watt metallised type (Dubilier).

RESISTANCE, VARIABLE
1—½-megohm potentiometer (Erie).

TRANSFORMERS, LOW-FREQUENCY
1—Ferranti AF10.
1—Ferranti AF8.
1—Output matching transformer.

SWITCHES
3—Make-break panel switches (Gol one).

ACCESSORIES

BATTERIES
1—High-tension, 120 volts.
1—Grid-bias, 9 volts.
1—Low-tension accumulator, 2 volts.

PICK-UP
1—Limit Reliance

VALVES
1—Marconi S23.
1—Mazda L2/DD.
1—Marconi LP2.

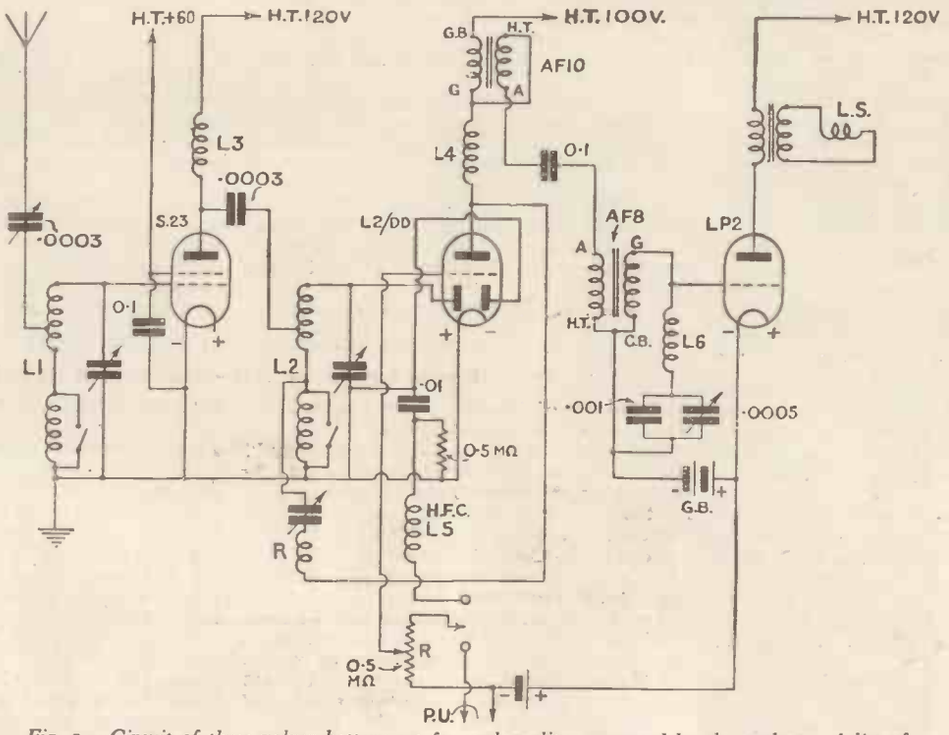


Fig. 1.—Circuit of three-valver battery set for real quality, suggested by the author. A list of recommended parts appears above

signals of distant stations, we certainly procure much better quality on the "local" station, and this is what is chiefly wanted.

The valve recommended is the Mazda L2/DD. This takes only .1 ampere in filament current at 2 volts, while the plate current is no more than 2 milliamperes at most at 100 volts, with a grid-bias negative of 3 volts. The amplification factor of the triode portion is 16, and the internal impedance is 10,000 ohms.

Normal Diode Practice

The diode circuit is clearly given in the diagram and follows normal practice. Provision is also made for inserting a gramophone pick-up for the playing of records. The volume-control potentiometer (R) will be found useful for both radio and gramophone, whichever happens to be switched on. Reaction is introduced in quite a normal manner, and needs no explanation.

Special Coupling

The coupling of the diode-triode valve to the output valve is something very special and is shown separately in Fig. 2. A complete patent was granted to the author in 1928, though the provisional patent was applied for in 1926. This is mentioned to prove the originality of the circuit.

It may be called "auto-transformer-fed auto-transformer coupling," but, of course, it is much more than this, for it is obvious that there are at least three ways of connecting up the two windings of each transformer! And it must be done the right way. Also, the right type of transformer must be employed in each case.

I claim for this method of coupling, not only a good frequency-response range, but really excellent performance under transient conditions. I also claim that it beats pure resistance coupling into a cocked hat! But I *never* recommend its adoption except immediately before the output valve.

In passing it on to readers of AMATEUR WIRELESS, I have no desire to thrust it on them. All I say is this: *try it*. It gives quality results quite obviously superior to any that can be obtained from resistance-capacity coupling: to those who are not hopelessly prejudiced and who have cars to hear, it is patently better. Even so, it is not the *last* word in coupling design.

Those who care to spend a little more money can improve results by substituting an AF8 transformer for the AF10, and an AF4 for the AF8. An AF3 in the grid circuit will be better still. But the results obtainable from the combination of AF10 and AF8 are not to be despised by any means.

Wiring Up

The wiring connections must be meticulously followed and checked up afterwards to make doubly sure that no mistake has been made.

The output valve chosen is the LP2. The high-tension applied to its plate is 120 volts, with grid bias negative of 4½ volts. Very little current will thus be passed from the high-tension battery; the complete set will not take more than 10 milliamperes, while the accumulator will only be asked to supply a total of .5 ampere.

An output matching transformer is, of course, necessary for coupling the LP2 to the speech coil of the loud-speaker. This latter must be of the low-resistance type, and a D.C. resistance of 6 to 20 ohms is recommended, the ratio of the transformer being chosen to match the coil accordingly. The ratios will vary from 25 to 1 down to 15 to 1.

A very useful and interesting high-note filter is incorporated in the grid circuit of the output valve for the benefit of those who would like to control needle scratch from their gramophone records and also heterodyne-whistle interference on radio signals. This filter is shown separately in Fig. 3.

A former 3½-in. in diameter must be used, and 2,000 turns of No. 32 gauge enamelled wire must be wound round it in what is called "pack" form, so that the complete winding does not occupy more than ¼ in. in actual width. This high-frequency choke coil will have an inductance of about .3 henry.

H.M.V. photo

The King's voice cut more than seven miles of wax when records of his Empire message were cut on Christmas Day

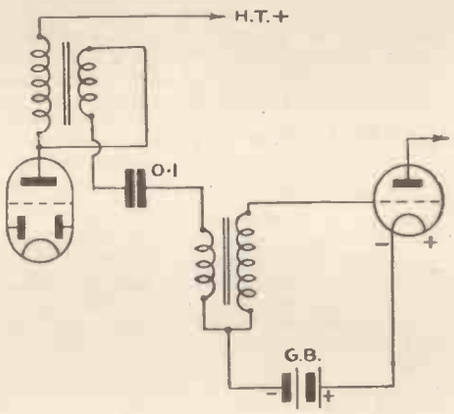


Fig. 2.—Special method of coupling between diode-triode and output valves

The next step is to connect in series with the choke a couple of condensers: these consist of a fixed .001-microfarad and a variable .0005-microfarad connected in parallel. The variable condenser can be of the midget type, such as the Jackson and must, of course, be mounted on the control panel.

By careful manipulation of the latter, it is possible to cut out quite a narrow band of frequencies in the region of 4,000 to 7,000 cycles without affecting those above or below to any serious extent.

For the elimination of needle scratch it may be necessary to use the whole of the capacity of the variable condenser in addition to that of the fixed .001; but for cutting out high-pitched whistles, should such occur in receiving transmission signals, the vanes of the variable condenser should be moved to the required point.

Optional Filter

It will be appreciated that this high-note filter is entirely optional, and need not be fitted to the set if it is desired to save expense. The quality of reproduction is not adversely affected by its omission, provided that there is no interference from adjacent transmissions in the case of radio, and no undue surface noise from records to mar the general effect.

A list of components required for making up this quality set is given in these pages, and reports from readers will be gratefully appreciated.

Don't overlook the Special Book Offer made on pages 24-25

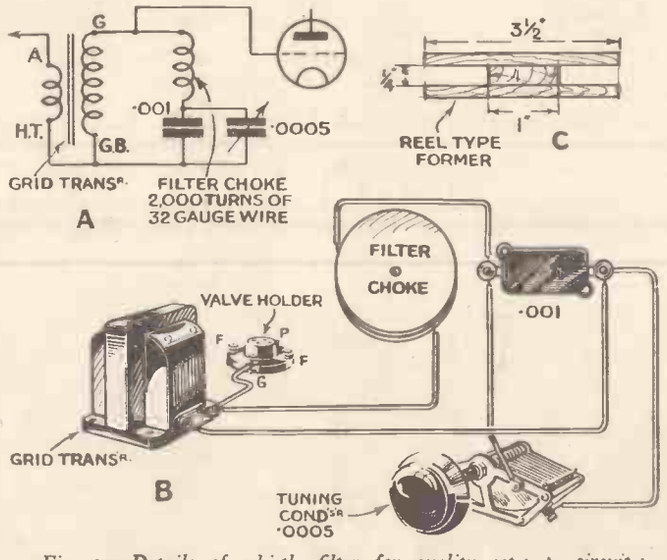


Fig. 3.—Details of whistle filter for quality set: A, circuit; B, diagrammatic connections; C, dimensions of former

Sets of the Season Tested . . . .

Aerodyne Radio Gramophone

Unlike many radio gramophones, the controls of the Aerodyne are mounted on the front of the cabinet—as is the well-designed tuning scale

SO far this year we have tested nearly all of the more important radio gramophones: Prices ranged from between 16 to over 100 guineas. Considering these receivers from the point of view of the average reader, we have come to the conclusion that the most popular type is the four- or five-valve super-het, which gives balanced quality at low output.

Quality at Low Volume

Just recently we have been testing the Aerodyne Cardinal radio gramophone at 20 guineas and another receiver in the connoisseur class, costing over £60. As a general rule, the 20-guinea receiver was the more popular for, when the volume was reduced to, say, 1 watt, the quality was infinitely better than that given by the big fellow designed to give 10 watts.

As regards the reception on radio, the smaller set would give 30 to 40 stations, while the big fellow perhaps gave 40 to 45, the total number depending more on the state of the ether rather than on sensitivity.

This Aerodyne Cardinal is without question almost the ideal receiver for a small house. If necessary the output can be increased up to 3,400 milliwatts, while quality is still really good, with ample bass, at 500 milliwatts.

Attractive Cabinet

The cabinet, of walnut, is very compact. Its appearance, in fact, always creates a very good impression. One visitor termed it the floodlit set; for, in addition to a brilliantly illuminated tuning scale, the motorboard is fully lit up, while the whole of the receiver internally can also be seen.

Actually the receiver consists of a heptode or octode frequency-changer, band-pass coupled to an intermediate-frequency amplifier. There is a diode speech detector, a second diode to provide automatic volume control voltage, and the triode first low-frequency amplifier. This triode is then resistance - capacity - coupled to a steep-slope pentode, while the A.C. mains input is rectified by means of an indirectly-heated valve giving 120 milliamperes.

You can see from the illustration, that the receiver is of the upright type with the controls at the front. There is the variable tone control on the left-hand side. In the centre the master tuner, while beneath it the radio volume control. The gramophone volume control is actually on the motorboard and is part of the combination Garrard unit.

The final knob is for wave-changing and to bring the gramophone pick-up into circuit; the receiver is switched on when you turn up the radio volume control.

A feature which should be strongly noted is the inter-station noise-suppression. This works extraordinarily well and the background noise, so familiar with simple receivers having A.V.C., is entirely absent.

Good Frequency Response

The frequency response is particularly good, varying between 48 and 5,500 cycles with a distinct rise below 200 cycles. This is an excellent idea, for at low volume the quality is very pleasant with ample bass. When the gramophone is in circuit, needle scratch can be cut off quite sharply by using the variable tone corrector, while on radio the very slight whistle behind Luxembourg can be wiped out in a similar way.

We were very glad to find that even with the lid raised there was no chatter from the gramophone pick-up when it was in action. This applied even on heavily modulated records.

A mains aerial attachment is incorporated, but owing to our mains supply being rather rough, we could not make use of this. The background noise level was rather high for this reason.

However, with a short length of wire along the carpet, we were able to bring in sufficient stations for average use, which speaks well for the efficiency of the pre-second detector stages.

Selectivity of 9 Kilocycles

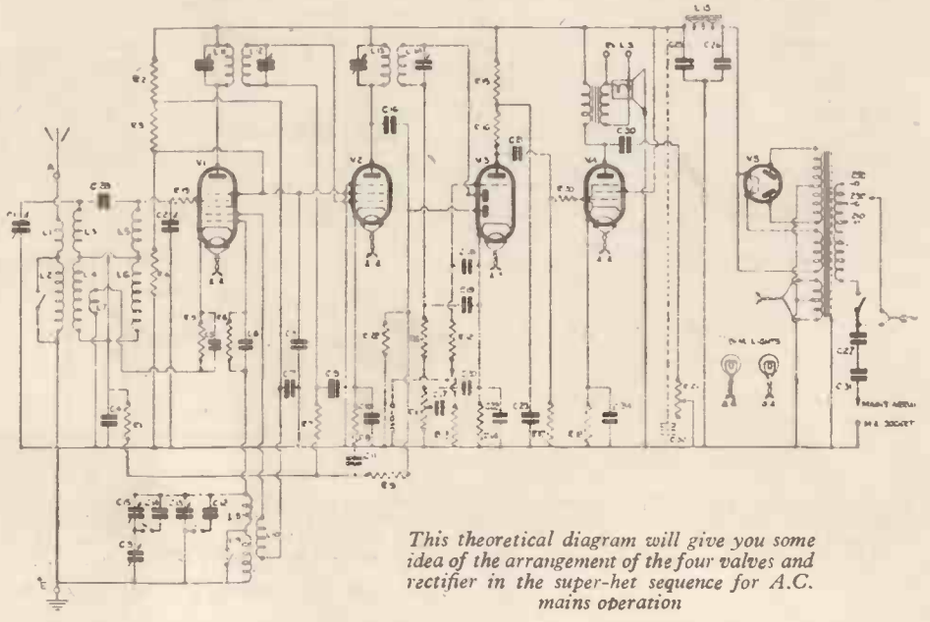
With an external aerial having a total length of 30 feet the receiver really did excel. Selectivity on the medium waves was a little better than 9 kilocycles. Stations separated by this frequency could be received without mutual interference and most of them, except those close to a local, were free from sideband splash. The automatic volume-control worked efficiently until the station quality actually began to deteriorate.

Few readers can memorise the wavelength of the stations under the Lucerne Plan, and a combined dial with wavelengths, numbers, and

Continued on page 40

IN A NUTSHELL

Brand Name : Aerodyne.
Price : £21.
Model : Cardinal R.G.
Technical Specification : Combined radio gramophone with a heptode oscillator/detector (Brimar 15A2) with a single intermediate-frequency amplifier, using a variable-mu high-frequency pentode (Mullard VP4), followed by a double-diode-triode (Mullard TDD4). The pentode output valve gives 3.4 watts (Mullard Pen/4VA) followed by a full-wave valve rectifier (Mullard IW3).
Power Supply : A.C. mains, 200–250 volts, 25–50 cycles.
Type : Combined radio gramophone.
Makers : Aerodyne Radio, Ltd., Aerodyne Works, Tottenham, N.17.



This theoretical diagram will give you some idea of the arrangement of the four valves and rectifier in the super-het sequence for A.C. mains operation

Criticisms by WHITAKER-WILSON

My Broadcasting Diary

THE Christmas programmes struck me as, on the whole, excellent. There was certainly a festive spirit about them.

Sunday

I BEGAN suitably by listening to Sir Walford Davies and the "Melodies of Christendom." Perhaps that put me in the right mood to hear Part I of the *Messiah*.

◆ ◆ ◆

I finished up with Albert Sammons playing Kreisler. Very nice, too. Consequently I went to bed in a more modern frame of mind than I should have done after hearing only that harpsichord in the *Messiah*.

Monday

AFTER seeing my stocking was safely hung up, I settled down to Stainless Stephen's one-man pantomime. No, Stainless! Dear old friend of mine (I feel that way, being Christmas Eve), you must do no more one-man pantomimes. You are too good to let yourself down. You will easily live that little affair down if your next broadcast is typically topical.

◆ ◆ ◆

Arthur Marshall monologued and Harold Ramsay rhythmed without upsetting me one way or the other, but . . . ah, yes . . . *but* those carols!

King's College, Cambridge, nearly ran their carols into 1935. Too slow for their own funerals. Carols are cheerful things. They made dirges of them. So did the St. Mary Whitechapel people.

Anything more depressing than those two carol services I have never heard. I would much sooner listen to a relay of a jolly funeral.

Christmas Day

ERIC MASCHWITZ'S Christmas Party the high-spot of the Christmas broadcasting. They seemed to be enjoying themselves in that studio. The whole thing was so genuine and Eric so obviously in his element that a two-hour show went like a flash. Really well done.

I don't seem to remember what happened after that. Sounds bad, but it wasn't from *that* cause, anyhow. Simply that we had all so much enjoyed the party we shut off. I imagine thousands did likewise.

Boxing Day

THE *Blue Beard* pantomime is a little difficult for me to judge. I am getting a little old for pantomimes and I can never quite get into the spirit of them. Judging from memories of past years, when I was thrilled by such things, I think I can safely say this must have been a most excellent specimen of the Drury Lane type.

I never appreciate Leonard Henry when he is tied down to lines he himself has not written—but they *will* have him in these shows.

Henry Hall, earlier in the evening, gave yet another of his admirable broadcasts. He has been splendid all over the holidays, with the children especially.

Thursday

OLIVER TWIST made better broadcasting than I thought.

I cheered up wonderfully over the Kentuckies. Their party was a very nice party even though they quarrelled a little. Bones was off colour in his stump speech, which was not too funny.

By the way, he must not give that little nervous cough after each joke. I believe he has been told so already. Perhaps he will let *me* tell him that it irritates listeners. Now, Bones! Your stump oratory must be the last word in perfection next time; you have something to live down over that stars-in-the-desert stunt, or whatever it was all about.

Saturday

I WENT up to St. George's Hall to-night just to see how a Music Hall compares with what one generally hears through a loudspeaker.

On the whole there is a very small leakage, by which I mean the artists see to it that their stuff is radio stuff.

Wilkie Bard was in costume and a very clever make-up. Listeners lost all that, and perhaps about five per cent. of his humour. Not more.

The Dancing Daughters naturally stand to lose over the air, but Clapham and Dwyer certainly lose nothing. Indeed, I think they are better broadcast, though it is difficult to say why. Perhaps it is that they are such perfect broadcasters.

Tod Slaughter must have sounded excellent. He, too, was in costume, which added to his effect; yet I noted most of the interest was in the lines and his tone in producing them.

On the whole, you can take it from me that there is no very great advantage in going to St. George's. It is the first time I have done so, as a matter of fact, though I have been to many rehearsals.

So that radio Music Hall is quite as good as, if not better than, St. George's Hall Music Hall. It is quite obvious that broadcasting is the first consideration.

Notes by J. GODCHAUX ABRAHAMS

My Short-wave Log

SHORT-WAVE transmissions are simply rolling in, and every week sees new additions to be made to our log. The holidays, with their late "party" nights, gave many opportunities for searches in the early hours and without doubt many of you, during this period, will have found a number of the distant transmissions for which you have tried in vain on previous occasions.

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Here are two newcomers of which all details have not yet been secured. A transmission in Spanish from Santiago de Cuba (Cuba) on 48.23 metres (6,220 kilocycles), of which the call sign would appear to be CM8— (the last letter is missing).

Reference is made to the *Laboratorias de Gran y Caimanero*, and the time at which the broadcast was received was G.M.T. 2200.

The second refers to a transmission picked up almost on top of YV5RMO, Maracaibo (Venezuela) on 51.28 metres, and apparently on 51.5 metres (5,825 kilocycles). Call was TIXGP3, San José, Costa Rica, and the address was given.

A closer investigation leads me to believe that this is a new station run by an amateur, possibly TI2EP, of San José, whose name Gonzales Pinto has supplied the fourth and fifth letters in the call. The number (3) tallies with the district.

◆ ◆ ◆

In addition to the already numerous short-wave stations installed in European capitals, we may now hope to listen regularly to the Budapest programmes. Following a number of tests, the Magyar authorities have decided to devote two of the many Szekesfehervar stations solely to the relay of the capital programmes.

HAS3 works on 19.52 metres (15,370 kilocycles) and HAT on 55.56 metres (5,400 kilocycles). Both are of a power of 20 kilowatts.

Although at the start the transmissions may not take place daily, the lower wavelength will be used between G.M.T. 1300-1400 and the higher channel after midnight, in order to make it suitable for reception in the United States. The first concerts were given on December 30 and 31.

◆ ◆ ◆

Listeners who are interested in ultra-short waves should note that Berlin is now carrying out regular daily transmissions on roughly 6 metres from G.M.T. 1500-2300. The broadcasts made at the Berlin studio are transmitted from the old Witzleben station which possesses the famous *Funkturm* as aerial. The programmes will consist of relays from the *Deutschlandsender*, from the Berlin station and from the Zeesen short-waver.

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LKJ1, Oslo, is now working on 31.45 metres (9,540 kilocycles) and also on 48.94 metres (6,128 kilocycles); do not mistake the latter channel for the Zeesen DJM transmissions on 49.35 metres (6,079 kilocycles).

Although there was some talk of closing down VK3LR, Lindhurst (Victoria) on 31.32 metres (9,580 kilocycles), transmissions are still being carried out daily between G.M.T. 0815-1230. As VK2ME, Sydney, 31.28 metres (9,590 kilocycles), only works on Sundays (G.M.T. 0600-0800 and from 1000-1600), any Australian broadcast heard on a weekday may be logged as emanating from VK3LR.

So far I have not picked up signals from VK3ME, Melbourne on 31.55 metres (9,510 kilocycles), although the Wednesday and Saturday schedules are still advertised in some wireless publications.

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CM2AN (Havana), is coming over particularly well, but in the South of England I cannot hear him until 6 o'clock in the afternoon. Anyhow, this station is really worth listening for; it uses high power and gives good quality.

A. J. West, of Merton, S.W.19, tells me that he heard PR5 (Rio de Janeiro) on 31 metres at 11 o'clock in the evening at R4.

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I have been doing some listening in the early mornings just recently, and I was amply repaid for my trouble.

The 75-metre band stations have been very consistent and, in fact, reminiscent of W3XAL at its best as regards strength. The 50-metre band commercials, most of them putting out dance music, could have been put on the loudspeaker.

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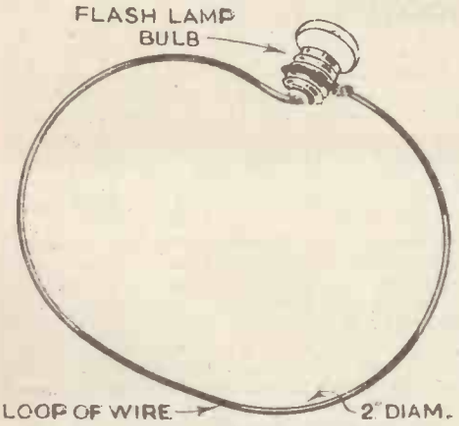
On the 160-metre band there have been quite a number of English amateurs and a whole host of Spanish. I have not been very fortunate during the evenings, as the 20-metre-band amateurs have gone off rather early and, as far as I am concerned, the 40-metre band has not been much use.

An Unexpected Burn-out



If a loop of wire is connected to a bulb it will light up brightly when brought near a transformer

THE other day, when playing around inside a radio-gramophone cabinet, I found it necessary to use a small pocket lamp in order to see some of the connections. Having made the necessary alterations I put the pocket lamp down in a spare space, went round to the front and switched on.

I noticed as I did so that there was a flash of light from the back, but everything seemed in order and the set warmed up and operated quite successfully.

It was not until I went round to retrieve the pocket lamp again that I found what had happened. The bulb had completely burnt out and after holding an inquest I decided that the explanation was as follows:

The lamp had been placed fairly close to the mains transformer. The stray field from this transformer had apparently induced current in the flashlamp and in particular through the circuit comprising flashlamp bulb, battery and metal case.

This formed a complete single-turn secondary in which sufficient current was induced by the transformer to burn out the bulb.

The stray field from a transformer is often much more than is commonly supposed, and it is quite easy to make up a small loop of wire connected to a flashlamp as shown in the diagram. If this is held near a mains transformer it will be found that in some positions the lamp will light brilliantly, while by rotating the loop at right-angles the lamp will go out altogether. By moving round the transformer in this way the stray field can be explored quite easily.

One should be careful to move slowly and not to get too near the transformer at first or the bulb may blow up before you start. The stray field usually begins to be appreciable two or three inches away from the iron.

J. H. R.

Headphones are urgently needed for use by patients in the Letchworth General Hospital. There must be considerable numbers of headphones which are no longer in use, so please send them along either direct to the hospital or to us here. An old pair of headphones will do much to brighten tedious hours. Remember the address—Letchworth General Hospital, Letchworth, Herts.

Broadcast Wavelengths

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

Principal Short-wavers

Metres	Kilo-cycles	Station and Call sign	Country
13.93	21,540	Pittsburgh (W8XK) ...	United States.....
16.86	17,790	Daventry (GSG).....	Great Britain.....
16.87	17,780	Bound Brook (W3XAL)NJ	United States.....
16.88	17,770	Eindhoven (PHI)	Holland.....
16.89	17,760	Zeesen (DJE).....	Germany.....
19.47	15,410	Riobamba (PRADO)...	Ecuador.....
19.56	15,340	Schenectady (W2XAD)	United States.....
19.64	15,270	Wayne (N.J.) (W2 & E)	United States.....
19.67	15,250	Boston (WIXAL)	United States.....
19.68	15,243	Paris (Colonial) (FYA)	France.....
19.72	15,210	East Pittsburgh (W8XK)	United States.....
19.73	15,200	Zeesen (DJB)	Germany.....
19.82	15,140	Daventry (GSF)	Great Britain.....
19.84	15,122	Vatican (HVJ)	Italy.....
23.39	12,825	Rabat (CNR)	Morocco.....
24.53	12,230	Lisbon (CTICT)	Portugal.....
25.00	12,000	Moscow (RNE)	U.S.S.R. .....
25.25	11,880	Paris (FYA)	France.....
25.27	11,870	E. Pittsburgh (W8XK)	United States.....
25.29	11,860	Daventry (GSE)	Great Britain.....
25.40	11,810	Rome (2RO)	Italy.....
25.45	11,790	Boston (WIXAL)	United States.....
25.51	11,760	Zeesen (DJD)	Germany .....
25.53	11,750	Daventry (GSD)	Great Britain.....
25.63	11,705	Paris (Colonial)	France.....
26.83	11,181	Funchal (CT3AQ)	Madeira .....
28.98	10,350	Monte Grande (LSX)	Argent. Republic
29.04	10,330	Ruysselede (ORK).....	Belgium .....
30.43	9,860	Madrid (EAQ)	Spain .....
31.25	9,600	Lisbon (CTIAA)	Portugal.....
31.28	9,590	Philadelphia (W3XAU)	United States.....
31.28	9,590	Sydney (VK2ME).....	New South Wales
31.297	9,585	Daventry (GSC)	Great Britain.....
31.35	9,570	Boston (WIXAZ)	United States ...
31.36	9,565	Bombay (VUB)	India .....
31.38	9,560	Zeesen (DJA)	Germany .....
31.45	9,540	Jeloy (LKJI)	Norway .....
31.48	9,530	Schenectady (W2XAF)	United States.....
31.545	9,510	Daventry (GSB)	Great Britain.....
31.55	9,510	Caracas (YV3BC)	Venezuela .....
36.65	8,186	Rio de Janeiro (PRA3)	Brazil .....
37.33	8,035	Rabat (CNR)	Morocco.....
38.47	7,797	Radio Nations (HBP)...	Switzerland .....
43.86	6,840	Budapest (HAT2)	Hungary .....
45.38	6,610	Moscow (RW72).....	U.S.S.R. .....
46.53	6,447	Barranquilla (HJIABB)	Columbia .....
48.69	6,425	Bound Brook (W3XL)	United States.....
48.86	6,140	Pittsburgh (W8XK) ...	United States.....
49.02	6,120	Wayne (W2XE).....	United States.....
49.08	6,112	Caracas (YVIBC).....	Venezuela .....
49.18	6,110	Chicago (W9XF).....	United States.....
49.18	6,110	Bound Brook (W3XAL)	United States.....
49.22	6,095	Bowmanville (VE9GW)	Canada .....
49.34	6,080	La Paz (CP5)	Bolivia .....
49.47	6,065	Nairobi (VQ7LO)	Kenya Colony ...
49.48	6,060	Byberry (W3XAU) ...	United States.....
49.48	6,060	Mason (W8XAL)	United States.....
49.5	6,060	Skamlebaek (OXY) ...	Denmark .....
49.59	6,050	Daventry (GSA).....	Great Britain.....
49.67	6,040	Boston (WIXAL)	United States ...
49.83	6,020	Zeesen (DJC)	Germany.....
49.92	6,010	Havana (COC)	Cuba .....
49.96	6,005	Montreal (VE9DR).....	Canada .....
50.0	6,000	Moscow (RNR)	U.S.S.R. .....
50.26	5,968	Vatican (HVJ)	Italy.....
50.42	5,950	Medellin (HJ4ABE).....	Colombia .....

Long-wave Stations

Metres	Kilo-cycles	Station and Call sign	Country	
1,107	271	Moscow (RCZ).....	U.S.S.R.....	100
1,144.2	262	Madona	Latvia	20
1,153.8	260	Oslo	Norway	60
1,209.6	248	Scheveningen Haven	Holland	5
1,224	245	Leningrad	U.S.S.R.	10
1,250	240	Vienna (Exp.).....	Austria	3
1,261	238	Kalundborg	Denmark	60
1,293	232	Kharkov.....	U.S.S.R.	35
1,304	230	Radio Luxembourg...	Grand Duchy ...	100
1,312.9	229	Ankara	Turkey	7
1,345	223	Warsaw	Poland	120
1,354	221	Motala.....	Sweden	30
1,395	215	Eiffel Tower (Paris)	France	8
1,442	208	Reykjavik	Iceland	16
1,442	208	Minsk	U.S.S.R.	35
1,500	200	Droitwich.....	Great Britain ...	150
1,571	191	Deutschlandsender	Germany	60
1,621	185	Istanbul	Turkey	5
1,648	182	Radio Paris	France	80
1,724	174	Moscow (1)	U.S.S.R.	500
1,807	166	Lahti	Finland	40
1,875	160	Kootwijk (Huizen prog.)	Holland	50
1,886.7	159	Brasov	Roumania.....	20
1,935	155	Kaunas	Lithuania	7

"COPIES WANTED"

The Editor of AMATEUR WIRELESS wishes to thank all those readers who offered back numbers that have gone out of print. The response has been so overwhelming that it will not be possible to send individual acknowledgements. All the copies needed have now been obtained.

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.

Changes in France

By JAY COOTE

WE have been told so many times that the Eiffel Tower was closing down that we are beginning to suspect that this station, like the old soldier, will end by merely "fading awaaay."

Again a statement has been made by the Ministry of Posts and Telegraphs that work is to be started *at once* on the plant of France's old broadcaster with a view to its conversion for work on a low wavelength, and that the first tests on the new channel will take place in April next.

When this change does take place it will be possible to show to what extent the unwarranted presence of Eiffel Tower in the long waveband interfered with the carrying out of the Lucerne Plan.

Further news from Paris points to the fact that the State-controlled stations, namely, Radio Paris, Paris P.T.T., Radio Colonial, and Eiffel Tower, have been forbidden to indulge, as hitherto, in advertising "puffs" or sponsored concerts and such a measure will tend possibly to an improvement in the programmes.

I say "possibly" as all depends on the revenue allotted to these studios. The immediate result, however, will be an increased wave of publicity carried out by the privately owned broadcasters both in the French capital and in the provinces.

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The mystery transmission which has been heard on recent Sundays between 8.30 and 11 a.m., and which could not be identified owing to the fact that no call was given, is proved to be Radio Lyons' new 25-kilowatter testing.

Apparently the French State has relented and has granted a permit for its use, probably until the high-power Lyons P.T.T. station is brought into being.

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Another broadcast which has puzzled listeners is one which has been picked up on the uppermost part of the medium waveband, in fact in most instances tuneable only at the bottom of the long-wave coil, just below airport channels.

This is Budapest (2) on 834.5 metres, which is now providing the Hungarians with an alternative programme. The signals are loud as the transmitter is rated at 20 kilowatts.

From Italy comes the information that a site has now been found for the new Guglielmo Marconi 50-kilowatt station which is to be erected in the neighbourhood of the inventor's birthplace at Bologna. Work is to be started on it at once.

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Make a note of a date in your logs, namely, January 16, when the Italian stations will broadcast the first performance at La Scala, Milan, of Mascagni's new opera *Nero*, conducted by the composer.

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Although it happens frequently that when proposals are put forward to install a new broadcasting station, in most instances at the outset the power suggested is a modest one, later, as the idea grows, so we find that something rather bigger is contemplated. Bergen (Norway) was to be endowed with a new 20-kilowatt transmitter. Latest reports tend to show that it may rank as a 50-kilowatter at least—and that it is to be completed by the end of 1935.

With Oslo, Trondelag and Bergen at our disposal, we shall have no difficulty in tapping Norway's programmes.

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In view of the fact that the International concerts taken by a number of transmitters of different nationality in Europe are being more developed every year, some arrangements should be made whereby the original studio broadcasts its announcements in several languages, and in particular in that of the country or countries to which the programme is mainly dedicated.

As a general rule, the Germans and Danes are very conscientious in this matter, but other countries, including Great Britain, mostly fail.

On a recent occasion, Radio Paris transmitted a concert for the benefit of Spain and Poland; the station made announcements in Spanish, but in *German* for the benefit of the *Poles*, with the result that they switched off the relay.

In view of the number of announcers now employed by most capital studios, it should be possible to include a few persons to be utilised on special occasions for announcements to foreign listeners.

Aerodyne Radio Gramophone—*Continued from page 36*

station names merely tends to confuse. The Aerodyne people have overcome these little troubles in quite a simple way. The tuning dial in front, a very large one by the way, is calibrated in wavelengths, 200 to 550 on medium waves, and 800 to 2,000 on long waves.

If you receive a station and you don't know what it is, you note the dial reading and then refer to a second dial on the motorboard on which you will find the name of the station which you have received. This arrangement works, of course, the other way round, and if you want to hear, say, Brussels, you find its relative position on the first dial and then tune the receiver to the required wavelength on the second dial.

In normal circumstances, we can assure readers that a minimum of 35 programmes will always be received. Owing to the design of the input circuit to the octode, second-channel interference has been reduced to the minimum, actually four whistles on both wavelengths.

Some of the stations which are rather difficult to receive were heard quite clearly. For example, Athlone was entirely free of interference from another station which almost invariably causes a high-pitched whistle.

Incidentally, Athlone was heard at lunch time at full loud-speaker strength. Langenberg and North Regional are also free from mutual interference, although North Regional was inclined to fade on occasions. Fécamp, Aberdeen and Bournemouth were all good catches, while stations on either side of the National were held for quite a long time with only the very minimum of side-band splash.

Numerous Aeroplanes

On long waves, in addition to Croydon, we heard numerous aeroplanes and, of course, the Heston weather reports.

We cannot speak too highly of the general design, construction and finish of this Cardinal receiver. We know that for many readers it will be the ideal set, while the price of 20 guineas will have a general appeal. Remember that quality is really good both on radio and gramophone.

Amateur Wireless — FEE 1/- — INFORMATION BUREAU COUPON — Available until Saturday, JANUARY 19, 1935

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See special offer on pages 24-25