

Amateur Wireless
May 31, 1930

SIMPLE BATTERY ELIMINATOR FOR D.C. MAINS

68

A THREE-VALVE PORTABLE OF NEW DESIGN

Every Thursday 3d

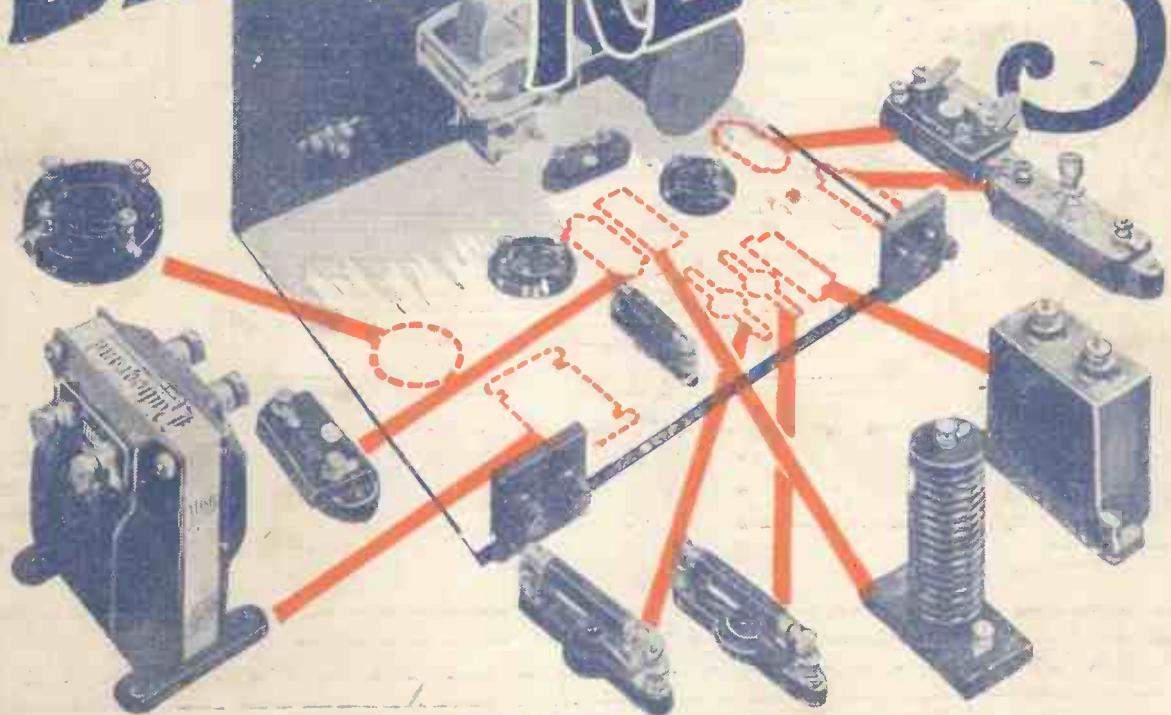
Amateur Wireless

and
Radiovision

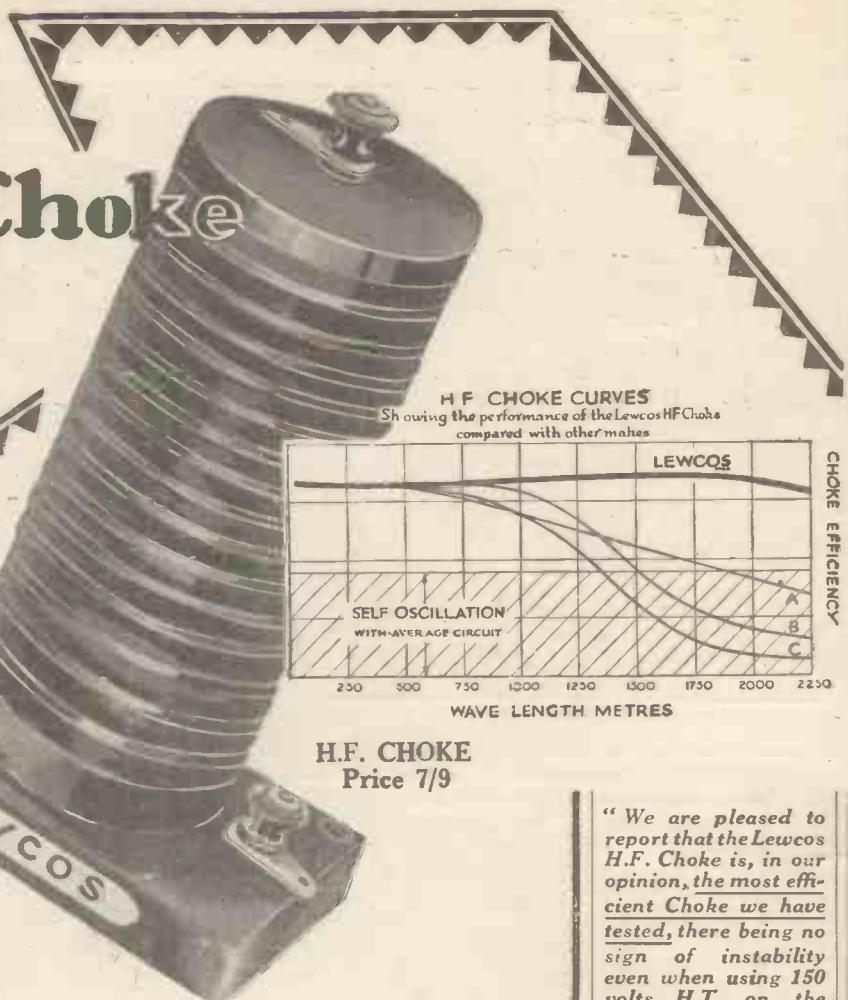
Vol. XVI. No. 416

Saturday, May 31, 1930

Build the
BEGINNER'S REGIONAL 3



"The Most Efficient Choke We Have Tested"



The above letter is a further appreciation of the unique qualities of the Lewcos H.F. Choke. The fine materials and the high-class workmanship used in its manufacture make it supreme. The terminals are arranged one at the top and the other at the base of the Coil, to eliminate the risk of additional self-capacity in the wiring of the receiver.

The H.F. Choke curves illustrated above show the astonishing performance and advantages of the Lewcos Choke over other makes.

A fully descriptive leaflet will be sent on request.

"We are pleased to report that the Lewcos H.F. Choke is, in our opinion, the most efficient Choke we have tested, there being no sign of instability even when using 150 volts H.T. on the Anode of the S.G. Valve. The construction is massive and well finished, and its design places it in the front rank of high-class components."

An appreciation from Industrial Progress (International), Ltd., Bristol.

THE LEWCOS H.F. CHOKE IS SPECIFIED FOR THE "BEGINNER'S REGIONAL 3" DESCRIBED IN THIS ISSUE

THE LONDON ELECTRIC WIRE COMPANY AND SMITHS LIMITED
Church Road, Leyton,
London, E.10

LEWCOS
Regd.

Trade Counter :
7, Playhouse Yard,
Golden Lane, London,
E.C.1

RADIO PRODUCTS FOR BETTER RECEPTION

Amateur Wireless

and Radiovision

The Leading Radio Weekly for the Constructor, Listener and Experimenter

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A Television "Fan"—The German Pictures—The Test Team's Talk—Our Critics!—A Free Show!

A Television "Fan"—One of the keenest television enthusiasts in the country is probably "Uncle Tom" Payne, the former station director of the Newcastle Station and now a prominent radio man in Newcastle. He writes: "I am pleased to inform you that this morning (Saturday) at about 1.5 a.m., by a mere chance, I switched on my receiver and picked up the Berlin (Witzleben) television transmission signal. Switching over to my televiser I had no difficulty whatever in finding the "frame" and a feature of the picture was the steadiness in the frame. Owing to very bad atmospheric disturbances I had difficulty in ascertaining whether the face I saw was that of a man or woman, but the lateral movement of the face was plainly discernible."

The German Pictures—"It appeared to me," he continues, "that the picture seemed to have more breadth than the English picture, and I also had the feeling that it was easier to hold, but, unfortunately, before I had really time to settle down to synchronise properly, the transmission ceased. It was rather regrettable that I only had about five minutes, but it was sufficient for me to be able to state that I had received television from Germany and, therefore, could claim another 'first' for the North of England." We wish him luck in his pioneer television experiments.

The Test Team's Talk—A last-minute breakdown in the wireless system prevented members of the Australian Test team from speaking by radio telephone to relatives in Australia from their hotel recently. The team rose early for the call because of the difference between English and Australian time. They were looking forward to saying "Good night" to their relatives. At half-past eight there was a ring on the telephone. But it was only a message from London to say there had been a breakdown! Later on the service was put right, and the 13,000-mile calls were successfully put through.

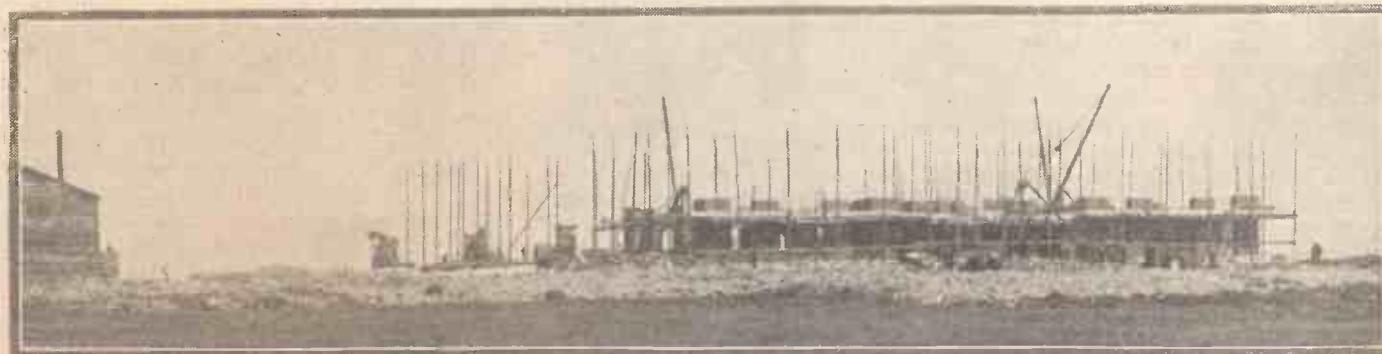
Our Critics!—The music critics seem to be thinking kinder things about the B.B.C. now than they did two or three seasons ago. Gordon Beckles, the well-known critic, says: "I am looking forward to seeing what Dr. Adrian Boult can do with the one picked band of players in this country to whom expense means nothing—the British Broadcasting Corporation Symphony Orchestra. The first thing to do is, obviously, to change its name, which now has the 'Gas Light and Coke Co.' ring about it." An editorial says, "As with all our enjoyments, we take music seriously. What other broadcasting corporation would dare to give us four unbroken hours of *Das Rheingold*, as did the British Broadcasting Corporation the other night?"

A Free Show!—"Walking along the

PRINCIPAL CONTENTS

	Page
Current Topics	709
The £ s. d. of the Regional Scheme	710
The "Sunshine Three" Portable	711
The N.B.C. on Selling Time . . .	712
Making a Simple Battery Eliminator for D.C. Mains	713
For the Newcomer	714
On Your Wavelength	715
Adapting a Set for Gramo-radio	717
My Wireless Den	718
Broadcast Artistes in Picture	719
Building the "Beginner's Regional 3"	720
A Local Station Portable	722
Without Fear or Favour	724
"A.W." Tests of Apparatus	726

Strand en route to the B.B.C. the other day," says a correspondent, "I happened to look in at the windows of Marconi House. There is a free radio show! Historic wireless apparatus, including early receivers used by Marchese Marconi and his collaborators, and an original Fleming two electrode valve, form part of an interesting display. On the 'modern' side there is the aircraft transmitter, receiver, and direction finder which secured the rescue of Captain Courtney and his companions when their flying boat caught fire and was forced to descend in mid-Atlantic."



This is the first photograph to be published of the new Northern Regional station at Slaitwaite. The general appearance of the building will be the same as that of Brookmans Park, but the finish will be in red brick instead of Portland stone. As will be seen, the work is already in an advanced stage

NEXT WEEK: Full constructional details of the "Sunshine Three" Portable

The L.S.D. of the Regional Scheme

Grousing at the B.B.C. is now a habit. On every side one hears complaints and suggestions; but have those who complain considered the financial side of the matter?

PEOPLE ask, "Why doesn't the B.B.C. do this," or "If only the programme department would spend more money," or even "We need better studios and more stations than at present." There is a modicum of praise as well, but the important thing that the grousers overlook is that in many directions the B.B.C. cannot improve because it has not the money to do so.

A case in point is the regional scheme. A long time must yet elapse before all the stations are put up and the new studios erected, and the B.B.C. is taking the regional scheme in easy stages. Brookmans Park has already cost about £100,000, it is said, and the new Moorside station will cost as much, if not more. The new Manchester headquarters premises cost a deal of money; the estimated cost of London's Broadcasting House has not been made public.

The Regional Scheme

It is fairly sure, however, that all these things bear no comparison with the sum of £300,000, which is all the B.B.C. has been able to put into the reserve fund for the regional scheme up till the end of last December. The B.B.C.'s annual report makes it quite clear that a large expenditure such as is entailed by the regional scheme, and the building of four or five giant stations, must eventually reduce the Corporation to a hand-to-mouth procedure with the Post Office, from which comes the greater portion of the B.B.C.'s income.

Other means by which the B.B.C. is able to raise funds, such as the sale of books, are considerable, but are certainly not more in total than 10 per cent. of the licence income. They were not more than about 10 per cent. in 1929. This means that if the B.B.C. intends to spend lavishly on the regional scheme, it will be more than ever dependent on the Post Office, and in turn upon listeners themselves, who provide the licence revenue. It does not need a wild imagination, therefore, to suggest a time when a "boycott" of the B.B.C. by listeners in any one district (such as might have happened recently in Birmingham during the centralisation controversy) will force the B.B.C. to move as the listeners desire.

Policy and Revenue

At present the B.B.C. is, to a certain extent, independent of listeners, because in official circles it has been fairly calculated that a considerable portion of listeners will cheerfully pay up no matter what the B.B.C.'s policy may be: that is typical of the British public, and so the B.B.C. did not have to put a census of public opinion before it launched out on the regional scheme.

The regional scheme is not the only direction in which most listeners want the B.B.C. to improve. Therefore the fact must be faced that there is not enough money for improvement, although the number of listeners is increasing month by month.

The Government's Share

A difficulty is, as everyone knows, that only a portion of the licence money reaches the B.B.C.'s coffers. What everybody does not know, however, is that under the terms of the Corporation's charter the B.B.C. is distinctly discouraged from aiding the increase in listeners. As the number of listeners increases, so the proportion of the

money taken by the Treasury increases.

Just what happens is this. Of all the licences collected, the Post Office retains 12½ per cent. to cover the cost of collection. Recent letters in our correspondence columns show that the opinion of many AMATEUR WIRELESS readers is to the effect that this 12½ per cent. is too much and represents an unfair profit made by the Post Office; doubtless the majority of listeners would prefer to see a larger portion of this handed to the B.B.C., which might result in better programmes.

But that is not all. In respect of the first million licences issued, the Treasury retains a further 10 per cent.; in respect of the second million, 20 per cent.; of the third, 30 per cent.; of anything over three millions, 40 per cent.

Now, the licences in force at the end of last year reached a total of 2,956,736, which is 329,000 higher than the figure for the previous year. This means that by now the three-million mark may have been exceeded.

In cash this means that the increase in revenue during the year was £164,500, but the B.B.C. received only £72,000! This shows what a large share was taken by the Post Office and the Treasury.

While the regional scheme is debatable in its benefits; it is obvious that progress must be made. At this stage the question may be fairly asked: Does the B.B.C. deserve a "rise"? If it does, then the two courses available are to press for a greater proportion of the licence money being handed to the Corporation, or for the Corporation to raise a loan.

It would be unwise for the B.B.C. to borrow, because the charter expires in 1936, and any capital borrowed would have to be repaid by then, at least to the extent of the difference between the cost now and the value of the assets in 1936. This would involve heavy sinking fund contributions; and the whole idea of the B.B.C. raising a loan seems very undesirable.

The only other course available, if the B.B.C. deserves a "rise," is for the charter to be altered so that the Treasury does not take so great a portion of the licence money.

KENNETH ULLYETT.



Pope Stamper—our cartoonist's impression



The SUNSHINE PORTABLE THREE

Preliminary Details of a New Portable Employing a Screen-grid Detector

By J. H. REYNER, B.Sc., A.M.I.E.E.

SOME time ago I designed a set known as the "Sunshine Five." One of the features of this was its relatively small size, and I have often felt that it would be interesting to put an up-to-date portable receiver into the same cabinet. Now some experiments which we have been conducting lately at the Furzehill Laboratories with high-frequency chokes in connection with screen-grid valves have shown that there are several chokes on the market to-day having a surprisingly high efficiency. So much is this so that they can be used very effectively with the modern screen-grid valve to form a stage of untuned amplification. As it is some considerable time since I designed a portable set for AMATEUR WIRELESS I felt that this would be an excellent opportunity of combining these several ideas into one whole.

The outcome is the "Sunshine Three," for I found as a result of my experiments that I could obtain results, with three valves only, equivalent to those which required five in the earlier days. The set has relatively few component parts, nothing whatever of a special character and is easy to build and should give reliable results in practice, comparable with those which I have obtained on my original model.

A Novel Circuit

The circuit is shown by Fig. 1, and it will be seen to be novel in one or two particulars. In the first place a simple frame is used applied to the grid circuit of the H.F. valve. The anode circuit of this valve contains a high-frequency choke across which voltages are developed that are applied to the next valve. Now the use of this H.F. choke is the first point of interest, for it is necessary that the impedance should be relatively high at all wavelengths within the band to be received by the receiver. The impedance of a high-frequency choke is not a constant quantity but in a case of this nature what we require is that the impedance shall be high relative to the stray capacities in the circuit, for it is

leakage effects which detract from the efficiency of the average choke-coupled arrangement, more than anything else.

As readers will have observed from the test reports which have appeared recently, a new method of testing H.F. chokes has been decided upon, as a result of much experiment. This method consists of a comparison of the choke impedance with that of a .0001 condenser. Fig. 2 (on page 730) shows the type of curve obtained for three different forms of choke. A is obtained with a choke which has not sufficient inductance, and it will be seen that it falls away at the higher wavelengths. B is obtained with a choke which has a large inductance but too high a self capacity, and it will be seen that this falls away rapidly at the short waves. C represents a good choke, which maintains a high value over the whole waveband, and if a choke of this performance is used, satisfactory results will be obtained in a choke-coupled circuit.

It is essential, therefore, that the choke shall be of the highest grade if satisfactory results are to be obtained, and no deviation should be made from the list of chokes specified.

A Screen-grid Detector

The next point of interest is the detector itself. A screen-grid valve has been used as a detector. This seems rather peculiar, but it results in a noticeable increase in the strength on the weaker stations. For example, at Elstree, I was able during my test to receive Langenberg in daylight on the loud-speaker. One would not call it good

reception, but it could definitely be pulled out of the carrier and was intelligible. With an ordinary valve this was not possible. A carrier could be obtained but the telephony could not be resolved, and this, I think, represents the difference that is likely to be experienced from the use of a screen-grid valve.

The circuit connections are exactly the same as usual, but only 18 volts are placed on the screen grid instead of the usual 80. With this connection the impedance of the valve is not unduly high, and the quality does not suffer to any marked extent.

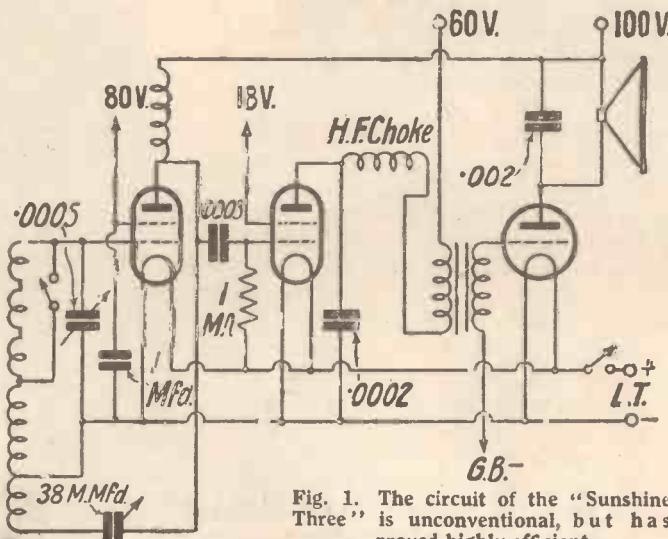


Fig. 1. The circuit of the "Sunshine Three" is unconventional, but has proved highly efficient

Naturally some of the bass is lost, but I have used a loud-speaker which tends to emphasise the bass, and the two effects match up quite nicely.

The detector is transformer-coupled through the low-frequency stage, and there is little to comment upon in this side of the set. In the hook-up I used a decoupling arrangement for the detector valve, but I found on making the receiver up that I could omit this and, therefore, I did so in the interests of simplicity. The instrument

(Continued at foot of page 730)

The N.B.C. on Selling Time

Following an interview with the Sales Promotion Manager of the National Broadcasting Company, of America, which

WHEN in a recent issue of AMATEUR WIRELESS, I asked whether the B.B.C. should "sell time," I had in mind the extraordinary commercial possibilities of such a scheme. By leasing certain hours of the available broadcasting time to advertisers, we could, I suggested, introduce far more frequent "high spots" into our broadcast entertainment.

Fabulous fees could be paid to artistes whose fame merited exceptional remuneration. The competitive element would also tend to liven up the proceeding.

An Authoritative Opinion

At the moment of writing, there is a man in London who should be able to throw further light on the subject of time selling. I am thinking of Mr. E. P. H. James, who is the sales promotion manager of the National Broadcasting Company, the largest single broadcasting organisation in America.

After a chat with Mr. James, I am more than ever convinced that a proportion of the B.B.C.'s broadcast entertainment should be paid for by advertisers. At present, there are two strong objections levelled against this idea.

Objection by Newspapers

Firstly, there is the objection of the newspapers. Already, a powerful newspaper body has imposed a ban on the insertion into space advertising of notices calling attention to broadcast advertising hours emanating from Continental stations. Those who have heard certain well-known British advertisers through Radio Paris and Radio Toulouse will have noticed that no reference to this form of advertising appears in the advertisement columns of the newspapers.

The line is taken that radio advertising competes with newspaper advertising. How far from true is this view could readily be proved by looking up the record of events in America. As Mr. James, of the N.B.C., pointed out, similar objections used to be raised against radio advertising by American newspapers. Then it was proved, conclusively, that so far from displacing newspaper advertising, either



A photograph of one of the latest N.B.C. Studios

advertising was an extraordinarily useful complement.

The N.B.C. official made it clear that no prices or other detailed references to advertisers' products were permitted in the broadcasting hours sponsored by the advertisers. The main idea is to bring the name of the commodity, or the maker of it, before the listener and to augment the interest thus aroused by detailed space advertising.

In the main programmes, the actual sales talk is reduced to a minimum. Association of ideas is a strong element; a sparkling-plug manufacturer puts on a light sparkling musical combination, whereas an electrical organisation of international repute impresses its high status upon listeners by associating itself with a high-class orchestra or operatic combination.

We must not forget that in America the public is more educated to advertising than we are. Americans admire salesmanship as much as we pretend to detest it.

The second and more serious objection to the introduction of advertising interests into B.B.C. activities is not so easily ruled out. It is contended that the programme standard would be lowered. Perhaps it would; but if, in the process, programmes were made more appealing, the middle-brow listeners who contribute the bulk of licence money would be well pleased.

Advertisers' Programmes

I do not think the B.B.C. is justified in assuming that the letters it receives are all indicative of the general attitude towards their programmes. We all know how dull are the Sunday programmes, but the B.B.C. do not admit this simply because its correspondence does not indicate it.

Advertisers' programmes in America,

corresponds in importance to the B.B.C., Alan S. Hunter throws further light on the subject of selling time by radio.

as broadcast by the N.B.C., certainly appeal to the listening public. Over there, listeners exert a considerable censorship on the programmes by their response or apathy towards the advertisers' offering. The criterion of approval there is not the correspondence received concerning a broadcast item, but the difference noted in the sales of the product advertised.

The N.B.C. official made a significant statement. "Please understand," he said, "that I am not trying to suggest the N.B.C.'s system is better than the B.B.C.'s. The B.B.C. is an admirable organisation and puts out some really fine programmes. All I say is that with advertisers' dollars, we of the N.B.C. can put on a higher percentage of good programmes."

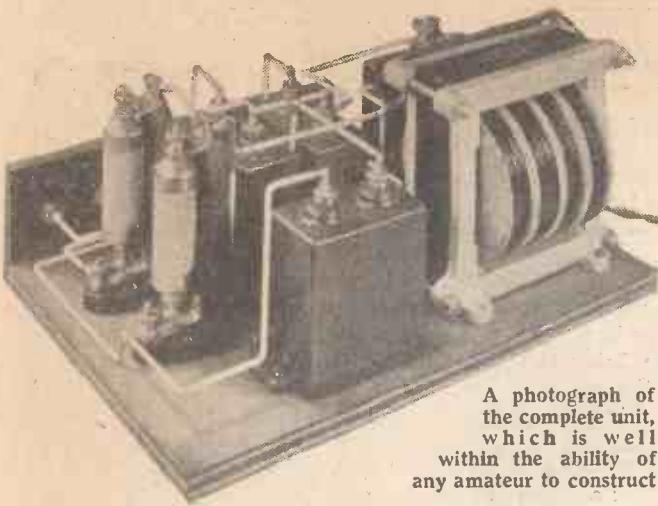
In considering the activities of the N.B.C., we must not overlook the fact that 40 per cent. of its broadcasting is sustained; it consists of items paid for by the broadcasting organisation. Sporting events broadcast cost the N.B.C. money. Although not primarily a public servant, the N.B.C. has ideals in common with our B.B.C. Government departments have considerable allocations in the broadcasting schedule, as have weather reports and farmers' bulletins and other items which are not of entertainment value.

Entertainment Wanted

The more one thinks about the standard of entertainment broadcast by the B.B.C. the more one is convinced that it could be better. It is my opinion that the introduction of advertising interests would mean a re-vitalising process, whereby broadcasting would really begin to entertain. The B.B.C. might be forced to abandon some of its higher ideals of popular education. But I am not among those who believe that broadcasting, any more than the screen, should lay itself out to educate. Its main job is to entertain.

I suggest that the N.B.C. has a greater scope to entertain than the B.B.C., because it has more revenue, a stricter public censorship, and a more vital motive force. There is little doubt but that private enterprise will always beat bureaucracy in the entertainment business.

MAKING A SIMPLE BATTERY ELIMINATOR FOR D.C. MAINS

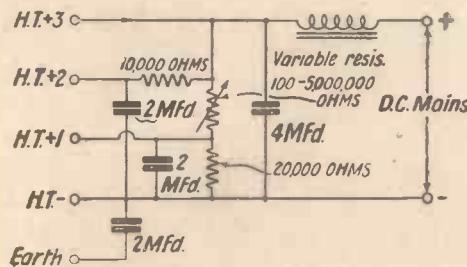


A photograph of the complete unit, which is well within the ability of any amateur to construct

THERE is one important thing to remember when making or buying a battery high-tension eliminator for direct-current mains, and it is this: choose a good one.

This may sound good advice, anyway, but the real reason is rather involved. You must bear in mind that within a few years practically every D.C. mains supply will, under the Central Electricity Board's scheme, be changed to alternating current. In some cases the local suppliers of current will be prepared to modify or exchange existing D.C. apparatus, including wireless eliminators, but in some instances the regulations may not provide for this, and then amateurs will have to make the simple alterations themselves.

Now, the point is this: if the D.C.



The circuit of the mains unit

eliminator is a good one, with efficient smoothing, it will be necessary to add only a small rectifier and transformer, and perhaps one fixed condenser, to convert the eliminator from D.C. to A.C. But, if the unit is poor, and does not give good smoothing even on direct-current mains, then it will certainly not work well on A.C. mains, and will need rebuilding. As practically every D.C. mains supply will be changed to A.C. within the next year or two, and in some districts the change-over has already been made, all owners of D.C. units must look to the future, and provide themselves with apparatus which, while not only giving the best results at the time of building, and on direct-current mains, will also need the minimum of conversion when the alternating-current supply comes along.

Just such a unit is the simple H.T.

battery eliminator here described. This is so simple to build that any amateur can make it up with the aid of only a screwdriver, a pair of pliers and a hand-drill. Even the ebonite drilling can be obviated, for terminal strips can be

bought ready drilled nowadays; and there is no panel to this H.T. unit.

It should be unnecessary to repeat what has been said so often about the "danger" of working from the mains. This D.C. unit uses so little current that it is hardly measurable on the meter during the course of a year, and provided it is made up exactly as described, and all the wiring is carried out with good-quality insulated wire, there is absolutely no danger of shocks or blown fuses.

The cost is low, as will be seen from an examination of the list of parts below.

Components

Baseboard, 9 in. by 6 in. (Pickett, Camco).

Smoothing choke (50-henries at 50-milliampères), (Parmeko, Lissen, Ferranti, Varley, Bulgin).

4-mfd. fixed condenser (T.C.C., Dubilier, Lissen, Hydra).

Three 2-mfd. fixed condensers (T.C.C., Dubilier, Lissen, Hydra, Ferranti)

Two 20,000-ohm wire-wound resistances with holders (Lissen, Igranic, Dubilier, Ferranti, Varley, Ready-Radio).

Variable resistance, 100-ohms to 5-megohms (Clarostat "Standard," Regenstat, Volustat).

Five terminals marked Earth, H.T.—, H.T.+1, H.T.+2, H.T.+3, (Belling-Lee type "B," Clix, Burton).

Connecting wire (Glazite)

Ebonite strip, 6½ in. by 2 in. (Lissen, Trelleborg, Trolite).

Length of twin flex (Lewcos)

Use Good Components!

Only the best and most suitable components are given in this list, and in the interests of "safety first," and of efficient working, it is most definitely recommended that cheaper "alternatives" are not chosen. Cheap resistances of unknown make will burn out without warning, condensers of similar calibre will break down and blow the mains fuse, and chokes of like ilk will give negligible smoothing and, owing to the high D.C. resistance, will give a low voltage. It is unreasonable to expect

parts "just as good" for half the money, and in any mains unit it is asking for trouble to fit components of unknown brand, for the sake of saving a trifle.

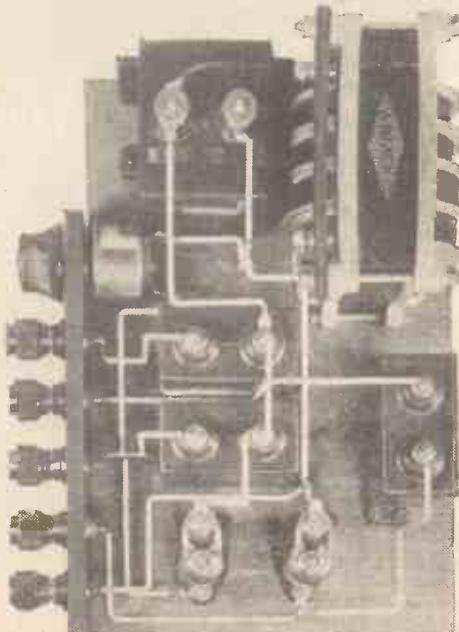
Simple Construction

The connections are simple, and constructors can follow the theoretical circuit diagram or the small reproduction of the wiring plan given herewith. A full-size blueprint can be obtained price 1s., post free, from the Blueprint Department of AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. There is no need to adhere rigidly to the layout shown here, and if the unit is being incorporated into a new set it may be more convenient to put the parts on a convenient part of the set's baseboard. It is unwise, though, to put the components of a mains unit too close to the receiver itself, for mains hum is only too easily induced into the receiver, and the false impression will be gained that the unit is not smoothing properly.

Carry out all the wiring with rigid, insulated wire, which is not difficult to work, and which does entirely obviate the possibility of short-circuits. Soldered joints are to be advised, for wires held down under terminals have a habit of working loose, and the result may be a blown fuse. Check over the wiring when the components on the little unit are connected.

When connecting the unit to the set, it is vitally important that the earth lead

(Continued at foot of next page)



This plan view should be compared with the wiring diagram on the next page

For the Newcomer to Wireless:

ANODE-BEND DETECTION

WILL you give me a concise explanation of the way in which the anode-bend detector does its work?

You will remember that we saw recently why negative grid bias was necessary for a low-frequency amplifying valve?

Yes. You showed that we had to use grid bias to prevent the grid of the valve from being made actually positive by the "crest" of a wave or so strongly negative by the following "trough," that the working point was taken down to the lower bend.

Exactly. And you will recall that we agreed that so long as this state of affairs obtains the rise in plate current produced by the crest of a wave reaching the grid is exactly equalled by the fall in plate current resulting from the arrival of the following trough.

That's quite clear.

In the amplifier, then, we want the plate current impulses to be exact copies of the grid voltage impulses. But we don't want this in a detector.

Why, exactly?

We want the detector to cut out as nearly as possible one-half of each wave. The anode-bend detector responds faithfully to the crests of the grid swings and makes a very poor response to their troughs.

Just how is that done?

We give it relatively a much stronger negative bias than the low-frequency amplifier. In this way we bring the working point not on to the straight portion of the curve, but just to the top of the bottom bend.

What is the result of this?

We will trace the history of a single wave, consisting of a crest and a trough, reaching the grid, regarding the crest as a voltage swing in a positive direction, and the trough as a swing in a negative direction.

I follow.

When the grid goes more positive, owing to the arrival of the crest, the working point is taken from the top of the lower bend a certain distance up the straight portion of the curve. This means that in the plate circuit there is a corre-

sponding rise in current, or, in other words, that the positive half-wave in the plate circuit is an exact copy of the positive half-wave reaching the grid.

Then what about the negative half of the grid swing?

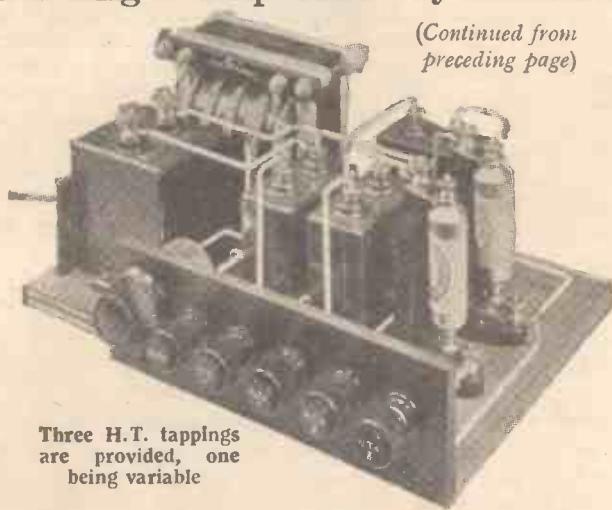
This takes the working point down on to the bottom bend. The result is that the decrease in plate current is quite small and that the corresponding half-wave in the plate circuit is not a perfect copy of the grid swing trough. In the plate circuit there is a trough, but its shape is very much shallower than that of the grid-circuit trough.

I see. The crest reaching the grid produces a full-sized crest in the plate circuit, but the grid circuit trough results only in a feeble impulse in the plate circuit.

That's it exactly. The negative half of the wave is, so to speak, strained out, though it is not entirely suppressed. Neither the grid-leak-and-condenser, nor the anode-bend detector are perfect in theory, though in practice each works pretty well.

"Making a Simple Battery Eliminator"

(Continued from preceding page)



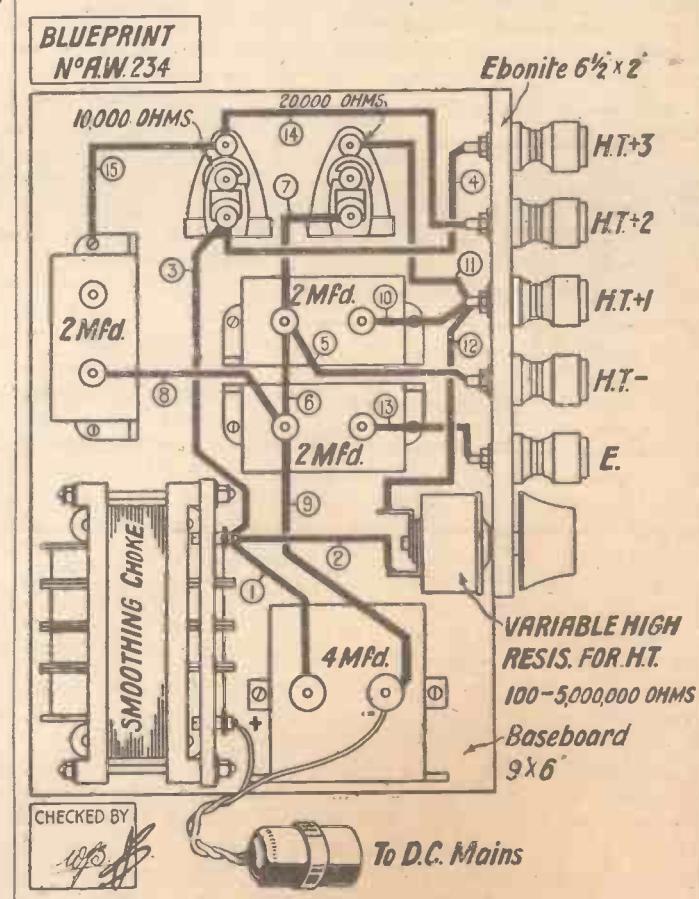
Three H.T. tappings are provided, one being variable

should be disconnected from the earth terminal of the set, and taken to the terminal marked "earth" on the unit. This will not upset the working of the set in any way.

The full voltage is obtained on the H.T.+3 terminal, of course; the first voltage drop is on terminal H.T.+2, and terminal H.T.+1 gives the lowest voltage. The variable resistance will be found very useful in controlling the voltage, particularly if the detector-plate voltage is critical.

Use good-quality flex for connecting the unit to the mains, and make the connection to the mains socket in a workmanlike fashion. Short-circuits can easily happen at the mains socket, and are blamed on to the eliminator. Cheap flexible wire often has internal short-circuits owing to the poor-quality insulation.

If this eliminator is made up as a unit, and not as part of a set, keep it in a safe place where metal parts are not likely to be dropped on to the "works."



The complete layout and wiring. A full-size blueprint of this may be obtained, price 1/-

On Your Wavelength!

Once More into the Breach

I CANNOT help having one more word on the subject of our D.S.A.'s. "And what," asks the reader, "is a D.S.A.?" Switch on your receiving set on almost any Sunday afternoon and you will realise that the D stands for dull. An improvement could very easily be made, particularly now that the regional scheme has come into operation with twin-wavelength working from broadcasting centres. Much as I hate saying "they do these things better in other countries," I cannot help giving you for comparison an account of the programme for Sunday, May 25, from WLW, which, by the way, is a private station run by the Crossley Company, and receives no subsidy from licence fees, and so on. The day begins at 9.30 a.m. with "church school," which is followed at 10.30 a.m. by a report of fishing prospects on the rivers. At 11 o'clock there is a church service. Noon brings a half-hour concert from the works of great composers. At 12.30 p.m. there is a light concert and another orchestra comes along at 1 p.m. From then until 12.30 a.m. the programme runs without a pause.

Plenty of Variety

There is variety, there is light music, there is more advanced music, there are soloists, there are entertainers. There is only one talk. Now, if a private station can run a continuous programme from 9.30 a.m. on Sunday morning until half an hour after midnight (with the exception of a twenty-five minute interval between 10.35 and 11 a.m.), surely a huge subsidised concern like the B.B.C. should be able to give us something just a little better than it does at present.

On Week-days

On week-days WLW, whose programmes are typical of those of the bigger American stations, runs a non-stop programme from 6.30 a.m. until 1.30 a.m. the following morning. And it is a good programme, full of bright items of just the kind to make a wide appeal to the generality of listeners. There is something in it for everyone. For the early risers there are physical jerks. The housewife gets talks on cooking and housekeeping during the morning, there are livestock reports for the farmer, sports reports—in fact everything that there ought to be in the way of general news, and really topical and interesting talks. The music given is of all kinds, from opera to jazz, and there is plenty of variety and light entertainment provided by first-rate artistes. When I mention that Amos and Andy are appearing every day just now in the studio, readers will see that WLW

listeners who want to laugh will have no difficulty in doing so.

An Example

When a broadcasting station provides a continuous programme daily for nineteen hours out of the twenty-four, no one can complain that he is not getting plenty of entertainment; dealers have ample opportunity of demonstrating receiving sets to prospective customers, and everybody is satisfied. If the B.B.C. cannot give us programmes with fewer huge gaps and fewer items of the kind that nobody wants, then something is wrong somewhere. We provide them with a vast income, and it is up to them to give us more for our money.

More About Orfordness

In a recent issue of AMATEUR WIRELESS there appeared a very interesting account of the Orfordness radio beacon. Readers may not know that the idea behind this apparatus was originally worked out by Dr. James Robinson, of Stenode fame. When he was head of the research and development department of the R.A.F., Dr. Robinson tackled the problem of finding something which would enable aeroplanes to discover their whereabouts when they had lost themselves. There were great difficulties about installing any kind of direction-finding apparatus in the plane itself, since big errors were apt to be introduced, owing to the metal work of the plane itself. Something which would enable bearings to be found with an ordinary receiving set was desired and this caused the beacon idea to be worked out.

Portable Economy

I wonder how many readers who possess portable sets have realised that they can now effect a very big economy in their running costs by making use of eliminators specially designed for the purpose. Naturally, you can't do this unless you have electric-lighting mains in the house; but if you have, the scheme is a very sound one. Several firms have recently brought out eliminators of very compact design of such a size that they will fit snugly into the H.T.B. compartment of any portable. Portables are really designed for occasional use, though, owing to their handiness, heaps of people employ them for regular reception. The standard-capacity battery so often used can take no greater load than 5 milliamperes if economical working is looked for. Most portables draw a good deal more H.T. current than this, so that if they are used for several hours every night rather frequent renewals of the H.T.B. are necessary, unless quality is to suffer. Here

are a few details of some eliminators that I have examined lately.

Working Off the Mains

For A.C. mains there is a particularly neat little eliminator which replaces the dry-cell H.T.B. It has all the necessary voltage tappings and it can supply as much current as the average portable will need at ridiculously small cost—a matter of a few shillings a year if the set is used for three hours a night on the average. The filament accumulator is left in place, but by means of a small switch the eliminator is made to act as a trickle charger when the set has been put to bed for the night. The accumulator is thus kept right up to the mark and all battery troubles are automatically solved. The cost of A.C. models is small, but that of D.C. types is still less. These, again, are of the same dimensions as the average dry battery designed for portable sets, and they are even more economical to run than A.C. eliminators. In both cases fitting is a matter of two or three minutes, and when the eliminator is in place, the set is provided with a flex cord and a plug which fits into a lampholder.

Safety First

Only the other day I came across an unfortunate who had blown up four perfectly good valves by having one of those little accidents which become so expensive. It was the old, old story. He wanted to adjust a semi-variable condenser and he had inserted a screwdriver into the works of his set whilst the local station was coming in. Unfortunately, his screwdriver touched a screen and the bare end of a lead at once and the same time. There were blue flames, and that was that. All the damage could have been avoided if only he had fitted his set with a simple fuse, costing an insignificant amount.

Quick Work

The other day I had an urgent communication from an American friend, so I sent him a radiogram. I wrote it out, handed it over the counter, paid the fee, and left the office. A minute or two later it occurred to me that it would be clearer if I added one word. I dashed into the office again and asked the clerk if I could make the addition. "I am afraid . . ." he said, "but I'll just see." He went to a telephone. "Sorry," he said after a brief conversation via the instrument, "but your message is on the other side now." How's that for quick work?

Screen-grid Valves at Sea

Mariners are finding the screen-grid valve of the very greatest assistance for long-distance reception; in fact, it is being

:: On Your Wavelength! (continued) ::

installed in the majority of vessels which keep their radio equipment right up to date. From the seaman's point of view, the screen-grid valve offers several very important advantages. First of all, no neutralising is necessary, which means that there are no delicate adjustments to be upset in rough weather. Secondly, it gives enormous amplification with complete stability, for the set is nowhere near the point of oscillation. This leads to a quiet background, which is of great moment when listening for weak and distant signals.

Another Application

Myself, I believe that the screen-grid valve has a very big future as an intermediate-frequency amplifier in super-heterodyne receiving sets. One of the characteristics of the valve is that the amplification obtainable goes up as the wavelength is increased. This is due, of course, to the tiny capacity which still remains between plate and grid. The effects become less and less noticeable the greater the wavelength. Enormous amplification is obtainable from two or three screen-grid stages in an intermediate frequency amplifier if signals are "beaten up" to a wavelength of 3,000 metres or so. Owing to the inherent stability of the valve, it can be negatively grid-biased, with the result that distortion is not introduced in the I.F. stages. This was far from being the case in some of the early super-heterodynes, the triode I.F. amplifiers of which were held down by the application of positive grid bias *via* a potentiometer.

A Photo-cell Valve Interrupter

While perhaps not applicable to normal television working, I was interested in a scheme which has been suggested and tried out for use in connection with photo-electric cell work. The current variations from the cell or group of cells are so minute that they are passed through an amplifier, and the output varies only in accordance with the rate of change of intensity of the light falling on the cell. If any situation arises where the incident light falls on the cell, either as a reflection from an object or as a direct application, it is usual to interpose a rotating disc interrupter in the path of the light ray. In this way a continuously varying component is imposed on the output current.

No doubt, readers will recall that this method was used in the Noctovisor apparatus used by Mr. Baird when picking up a light in a fog. The beam was "chopped," but the new scheme proposed is designed to avoid this necessity. The photo-cell output, after passing through the amplifier, is applied to the first grid of a tetrode (double-grid valve). A constantly varying

voltage from an outside and independent source of oscillation is then fed on to the second grid.

A Promising Idea

Now, under normal conditions, very little or even zero current flows through the plate circuit of the tetrode until the cell is energised by an incident light ray. When this does happen, however, the voltage on the first grid of the tetrode causes a passage of plate current, and this is automatically modulated by the separately energised second grid. The scheme is capable of various applications, but it occurred to me that with the Baird Noctovisor the arrangement, which has been devised and incidentally patented, might prove very useful if the special chopper disc, which has hitherto proved most efficient, had to be discarded.

Sidebands and Television

Protagonists of the sideband and anti-sideband theory of wireless transmission continue to cross swords with one another. The science of television has been drawn into the arguments, for it is claimed that with the present 9-kilocycle separation allocated to sound broadcasting the amount of detail in the images secured from the vision transmissions is necessarily restricted. Supporters of the sideband theory have both practically and theoretically demonstrated their existence in many ways.

Resonance curves of a selective receiver have been taken with an unmodulated and then with a modulated-valve oscillator, and resonant humps in the latter case existed at the frequencies theory predicted. Another point of view put forward is that a mathematical alternative invariably corresponds with some physical reality. Therefore, a sinuous wave of fluctuating amplitude may be rightly and exactly represented as if it were a band of neighbouring frequencies. Then, when making especial mention of television, it has been pointed out that the real issue does not lie in the change of current amplitude brought about by the varying reflected light, but by what rate of change of amplitude is admissible. No doubt, the whole matter will be thrashed out to a successful conclusion, and in the meantime we can at least accept things as they stand.

High Waves Again

With many listeners the high broadcast wavelengths were falling into disuse—until the Regional Scheme was put into operation. The fact that a set designed for working on the medium broadcast wavelength of from 250 to 550 metres was so much easier to make and to "gang" for one-dial control, converted many to the American point of view on reception. And in U.S. the fact that all broadcasting stations are

within this range of wavelengths, and that over 75 per cent. of the electric-lighting supplies are A.C. 60 cycles, has resulted in a standard design of set supplied in "kits" and fully assembled on a mass-production basis. The efficiency of these sets may be only fair, but the simplicity of tuning control and, in many cases, the quality of reproduction have satisfied the most finicky of American radio listeners. The situation is different in Europe, however, and the higher wavelengths are necessitated for many reasons; the chief being the unhealthy state of the ether on low wavelengths.

"Way Up"

There is plenty of good music to be heard on the high wavelengths, with Königs-wusterhausen (called "Sausagehausen" by the profane), Hilversum, Radio Paris, and Kalundborg. Things seem to be in much less of a heterodyne-cum-atmospheric mess way up in these high wavelengths, or, if you prefer it, on the lower frequencies. Fading is practically non-existent, and the more distant stations are less subject to distortion than their shorter wavelength brothers at about the same distance. Freak effects and enormous strength at long distances are characteristic of the shorter-wave transmissions, but the variations of both quality and strength are frequent outside what is usually termed the "service area" of the stations.

Mass-production Broadcasting

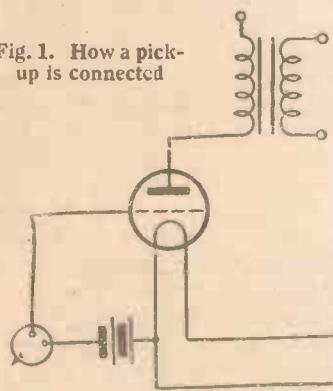
The face of the broadcasting ether changes slowly and surely as it grows older. Veteran listeners will remember the first days of the B.B.C., when Glasgow, Manchester, and Newcastle used to come in with great strength in the London area, and even the relay stations were heard at great distances. These stations, so far as their transmitters are concerned, have changed very little and have not reduced power nor modulation; nevertheless, they seem to have become weaker and weaker when received at the same distance. This apparent degeneration is due to the increased jamming by stronger stations, more mush, and backwash from harmonics of commercial radio telegraph stations, and to the less obvious fact that these stations now do so much simultaneous broadcasting, thus losing individuality. I must say that I like the American idea of allowing each station taking part in a simultaneous broadcast to make its own announcements before, during and after such a programme. The B.B.C. policy is tending to take away more and more of the "characters" of stations, and the individualities which made them so interesting to the DX listener in the early days. The abolition of call signs is another step in the progress towards mass-produced broadcasting. THERMION.

Adapting a Set for Gramo-Radio

THOSE who wish to use a pick-up with the low-frequency amplifying part of a receiver ought first to find out the average voltage set up in the coils of the pick-up and then to estimate the magnification.

Some pick-ups are very sensitive in com-

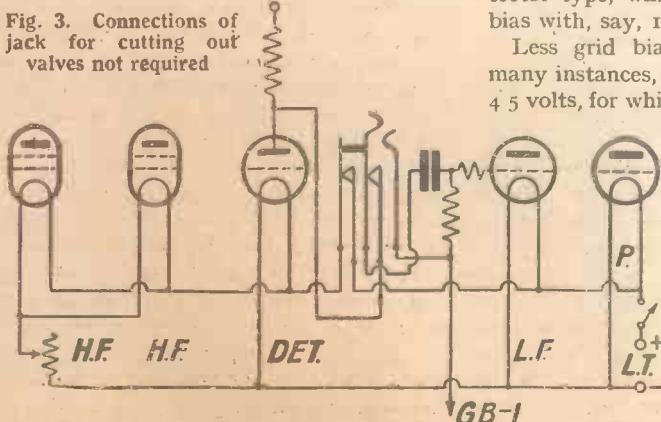
Fig. 1. How a pick-up is connected



parison with others. One make that I have tested gives about 0.1 volt for passages of ordinary strength when using a suitable needle and another gives about 2 volts under equivalent conditions. Thus one is twenty times as sensitive as the other, and if the amplifier were only just suitable for the sensitive one, little would be heard when the other pick-up was tried.

With the average voltage to start with (it is a rough figure, I know, for who can tell what peak values are produced?) we can estimate a value of grid bias (Fig. 1). We must remember that very loud passages may cause voltages of several times the average to be set up and arrange the bias

Fig. 3. Connections of jack for cutting out valves not required



Some Practical Advice by W. JAMES

accordingly, not forgetting to allow something for peaks. With our pick-up giving 2 volts as an average, therefore, we might very well start with a bias of 9 volts.

No doubt many readers will be surprised at the suggestion of so high a voltage for grid bias, but this value is one that I use myself.

With less grid bias, grid current flows on occasions and a milliammeter connected in the anode circuit of the valve shows distortion on loud, low passages. Many pick-ups give smaller voltages, but I would suggest to gramophone enthusiasts that this point be considered with care. Voltages much greater than many people think possible are often produced and should be allowed for if good quality of reproduction is desired.

Having fixed in our minds an approximate value of grid bias, we must next see that the valve is suitable. A small power valve will take a bias of negative 9 volts with 120 volts of high tension, and there are others of the L.F. or "steep-slope" detector type, which will take this value of bias with, say, 160 volts of high tension.

Less grid bias will be satisfactory in many instances, a good average being 3 or 4.5 volts, for which L.F. valves are suitable.

Should a volume control be provided across the pick-up itself, then the bias can be less, such as 1.5 volts, for the input can be cut down in value to suit. When the whole output is taken to the valve, however, the bias must be sufficient to deal with peak values.

Now, a pick-up will not drive a power valve direct and provide good loud-speaker signals. A stage of amplification must be used.

Let us suppose, therefore, that the pick-up is connected to the grid of the fourth valve of the "Quality Five," described in Nos. 409 and 410 (see Fig. 2). In the anode circuit of this valve is a transformer having a ratio of say, 3 to 1. If then the valve has a magnification factor of 12, the total magnification is 36, approximately. This may be too much, but as a volume control is fitted in the set (being an adjustable

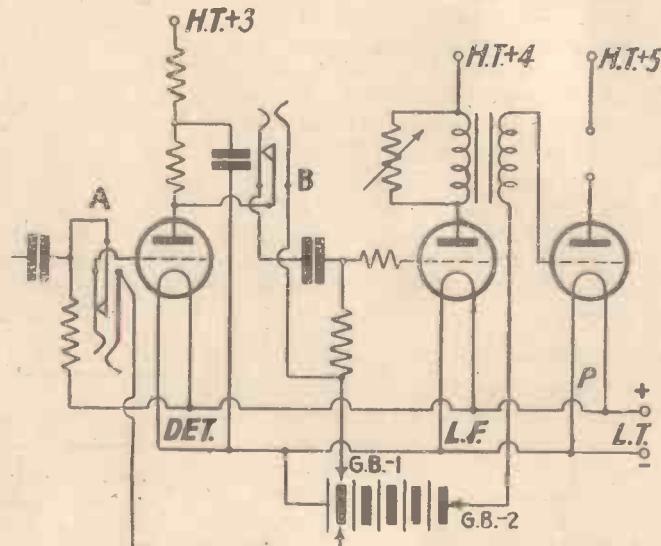


Fig. 2. Connecting pick-up jack to detector (A) or first L.F. valve (B)

resistance joined across the primary coil of the transformer) the amplification can be reduced to suit.

A big reduction may be needed, depending upon the size of the power output valve and its characteristics. Thus, if the power valve is biased 18 volts, and the pick-up is a sensitive one, a magnification of three or four times only may be needed.

With a pick-up giving only 0.1 volt, the last valve will not be fully loaded, as the average voltage applied to it will be of the order of only 3.6. When a pick-up of this insensitive type is used, then, connection had better be made with the detector. Alternatively, a transformer

(Continued at foot of next page)

MY WIRELESS

*Weekly Tips,
Constructional and Theoretical—*

Why Tune H.F. Valves?

In order to avoid adding to the tuning of a set a high-frequency stage having a choke or resistance coupling is sometimes used. This stage certainly adds to the magnification; but, personally, I should prefer to use a broadly tuned coil that could be ganged with one in the set.

This further circuit would give fair magnification and provide an amount of selectivity, and tuning would not be complicated, because a ganged condenser would be fitted. In these days, when selectivity is of such importance, the merits of the proposed arrangement are sufficiently obvious to need no more comment.

S.G. Detectors!

The screen-grid valve is primarily intended for high-frequency amplification, but tests have shown that this valve is also suitable for detection. It may be used in two ways.

First, with the screen-grid joined to a point in the high-tension battery and, secondly, with the screen-grid connected to the grid circuit and the normal grid taken to a high-tension voltage.

In the first method, which is the one most often used, either the leaky-grid or anode-bend system may be adopted. A resistance capacity coupling is used to the first low-frequency or power valve.

Suitable values are 250,000 ohms for the anode resistance, .05 microfarad for the coupling condenser, with a 1- or 2-megohm grid leak. Owing to the high value of anode resistance, it is necessary to take precautions to ensure that the higher notes are not lost. Stray capacities must, therefore, be reduced to the minimum. If they are too high, a lower value of anode resistance must be used, but this will naturally tend to reduce the magnification of the medium frequencies.

A New Point

I was trying a few new pick-ups the other day when it occurred to me that very little has ever been written about amplitude distortion.

We often hear of frequency distortion,



DEN BY W.JAMES

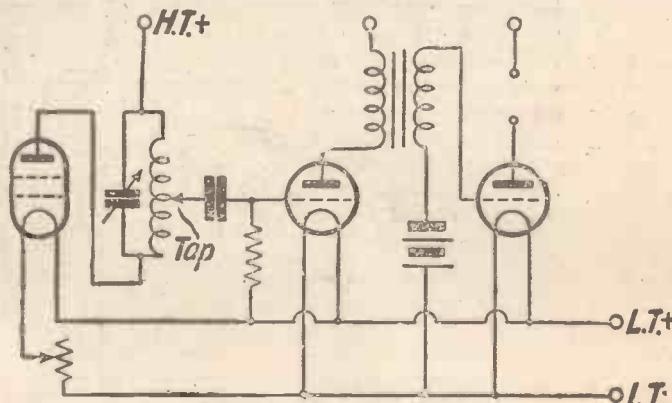
*For the
Wireless Amateur*

and curves are sometimes prepared to show this. But amplitude distortion, which may be very serious, is seldom mentioned. This point needs looking into.

Detector Connections

A point of some importance to those who try a so-called "power" detector is the connection of the grid condenser to the tuning coil. If it is so joined that the whole of the tuned circuit is across the grid circuit of the detector, the tuning of this circuit will be very flat.

Further, owing to the fact that the impedance of the grid circuit is low in



The detector circuit of this arrangement is referred to by W. James in the accompanying paragraph

comparison with that of the tuned circuit, the actual voltage is considerably reduced.

In the accompanying diagram is shown a well-known method of avoiding, to an extent, these effects. The grid condenser is connected to a tap on the coil. Therefore the selectivity is improved, and it is possible that the signal strength itself is also increased.

I doubt whether the complication of the circuit is worth putting up with in a multi-valve set, but with only one high-frequency stage the benefits are worth having.

L.S. Connections

Those who use a high-resistance type of loud-speaker and connect it directly to the last valve of a set ought not to forget that a fair amount of wastage occurs. With a

2,000-ohm instrument, for instance, and a current of 10 milliamperes, the voltage lost is 20.

This is a considerable part of a 120-volt high-tension supply. The 20 volts might make an amount of difference to the results, which is why a choke-capacity filter or transformer output is to be recommended. These parts usually have so low a resistance that the voltage lost is negligible, besides which there are other advantages.

Few loud-speakers are really happy with a heavy current passing through them. The windings may not burn out, but the magnetic system may suffer. Then there are, of course, the well-known advantages of the output filter and transformer arrangements, the chief being that as audio-frequency currents are largely diverted from the high-tension supply, the tendency for motor-boating to occur is minimised.

ADAPTING A SET FOR GRAMO-RADIO

(Continued from preceding page)

having a high ratio could be used between the pick-up and the set, but I would rather employ the extra valve.

It is an easy matter to connect a pick-up to the detector or first L.F. valves as indicated in the figures at A and B. Fig. 2 shows the grid circuit connections only, but when the filaments of the valves are to be switched as well, the wiring of Fig. 3 may be used.

Some may prefer to plug an adaptor into the detector valve holder. This is a satisfactory method when enough output is obtained from the pick-up. Those having a mains unit giving plenty of output so that a good power valve can be used will be able to obtain fine results from a pick-up through the set. With only 120 volts of high tension interesting results may be obtained, but many would consider them not worth while.

It is sometimes necessary to connect one side of the pick-up to the case and carrying arm in order to avoid howling. The grid-bias side should be taken to the case, rather than a separate earth.

BROADCAST ARTISTES IN PICTURE



FRED DUPREZ.—One of the best-known wireless character actors, Mr. Duprez is a noted variety star at most of the big London halls.



DOROTHY DANIELS.—This clever pianist figured at the same concert as Miss Pollock, given by the City of Birmingham Police Band.



STANLEY RILEY.—As singer, actor, and conductor Mr. Riley has become a prominent figure in broadcasting as well as musical and theatrical circles.



DOROTHY WITCOMB.—In a recent symphony concert from the Midland Regional Station she contributed many popular songs by modern British composers.



PAUL HERMANN.—A famous cellist, Mr. Hermann has given several wireless recitals, a special one being in a recent Sunday programme.



MARY POLLOCK.—One of the most frequently heard sopranos, Miss Pollock has been heard from practically all stations. One of the most recent was from the Midland Regional.



DR. HAROLD RHODES.—This famous organist was recently heard in a special recital relayed from Coventry Cathedral.



MERCIA STOTESBURY.—A violinist heard very frequently. In her Sonata recital this month she joined forces with Adelina de Lara the well-known pianist.

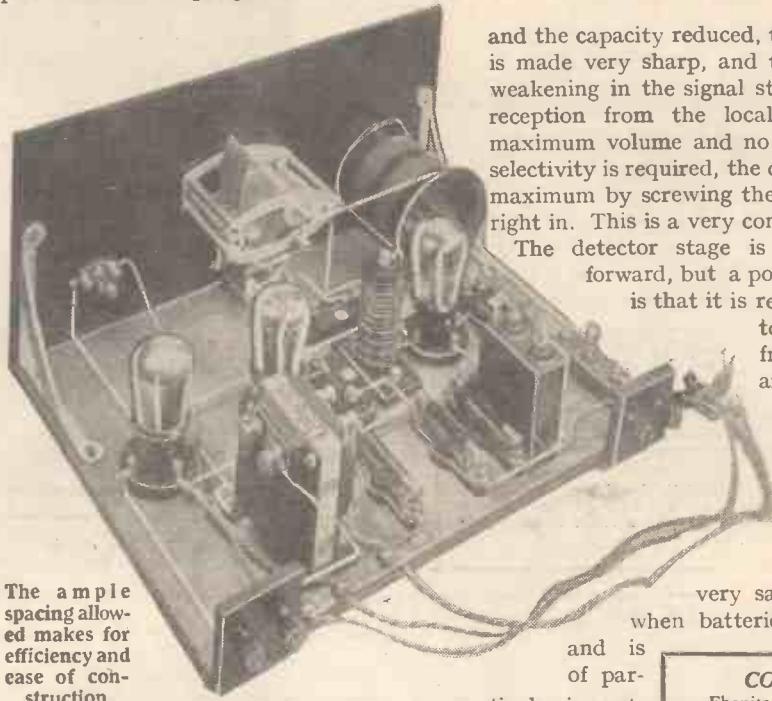


JOSEPH LEWIS.—Musical Director of Birmingham station. His Midland Wireless Orchestra is outstanding.

LAST week it was explained how the "Beginner's Regional 3" justifies its title and why it is particularly suitable for beginners now that the regional scheme is working.

The salient points of this simple explanation may be reiterated briefly. The "Beginner's Regional 3" is a straightforward three-valver incorporating a detector and two low-frequency stages. The fact that no high-frequency stage is employed means that there are only the aerial and reaction control knobs to turn, and these do not have to be manipulated at the same time; in most H.F. sets there are at least two knobs which demand simultaneous operation.

Dispensing with the H.F. stage results in a great saving in cost. Screen-grid H.F. valves are not cheap, and the economy effected by doing away with not only the need for a screen-grid valve, but also for its metal screening in the set and the complicated H.F. couplings, is considerable.



The ample
spacing allowed makes for
efficiency and
ease of construction

A type of Hartley tuner is employed, that being the name given to a well-known form of aerial-reaction circuit which is by no means new and which has stood the test of time, both in America and in this country. The tuner is of the dual-range type and covers both the medium band and long wavelengths. This is done by short-circuiting a portion of the coil windings.

The Hartley arrangement is very selective and this natural selectivity is further aided by the provision of a variable condenser in the aerial lead. The operation of this will be described in detail later, but the general principle of these pre-sets is probably well known: as the knob is slackened off

and the capacity reduced, the aerial tuning is made very sharp, and there is a slight weakening in the signal strength; for best reception from the local station where maximum volume and no great degree of selectivity is required, the capacity is set at maximum by screwing the adjusting knob right in. This is a very convenient control.

The detector stage is quite straightforward, but a point worth noting is that it is resistance-coupled to the first low-frequency valve, and to prevent any possibility of "motor-boating" an anode filter is included. This anode filter arrangement is very satisfactory, even when batteries are employed,

SIMPLE, CHEAP AND EFFICIENT

is, of course, at loud-speaker strength. It will never be necessary to use phones for reception, even with a very poor aerial or a small wire erected indoors.

Simple Construction

No constructional difficulties will be encountered, for, as mentioned last week, the layout has been made as simple as possible and the whole job of construction should not occupy more than one evening, using the kitchen table as a work-bench and only a few simple tools.

A full-size blueprint is available, No. 233, and can be obtained, price 1s., post free, from the Blueprint Department of AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4. A reproduction of this was given last week, but the separate print obtainable is actually full size and gives every component in its exact position. It shows all the wiring, too, and if you follow the print exactly you will have no need to fear wrong

COMPONENTS REQUIRED

Ebonite panel, 14 in. by 7 in. (Trolitax, Becol, Lissen).

Baseboard, 14 in. by 10 in. (Pickett, Camco).
.0005-microfarad variable condenser (Lissen,
Ready-Radio, Dubilier, Igranic, Lotus, Burton,
Polar, JR).

.0001-microfarad reaction-condenser (Lissen, Bulgin, J.B., Dubilier, Lotus, Burton).
 Dual-range coil (Bulgin, type A, Tunewell).
 Push-pull filament switch (Bulgin, Lissen, Lotus, Benjamin, Ignac, Wagar).

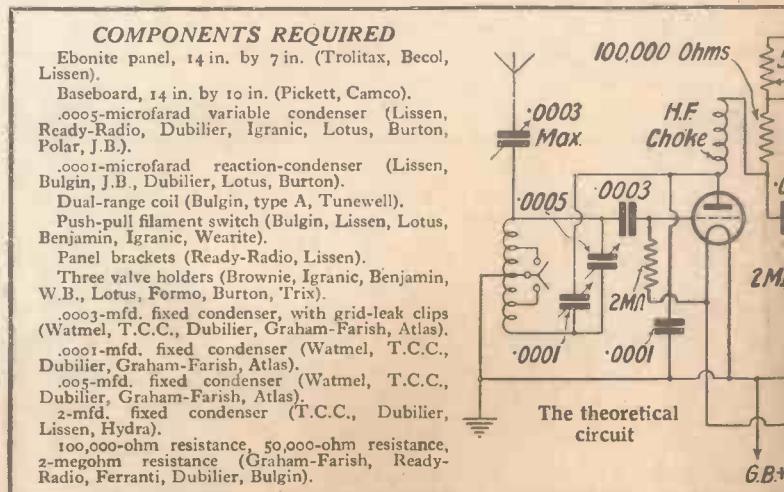
Panel brackets (Ready-Radio, Lissen).
Three valve holders (Brownie, Igranic, Benjamin).

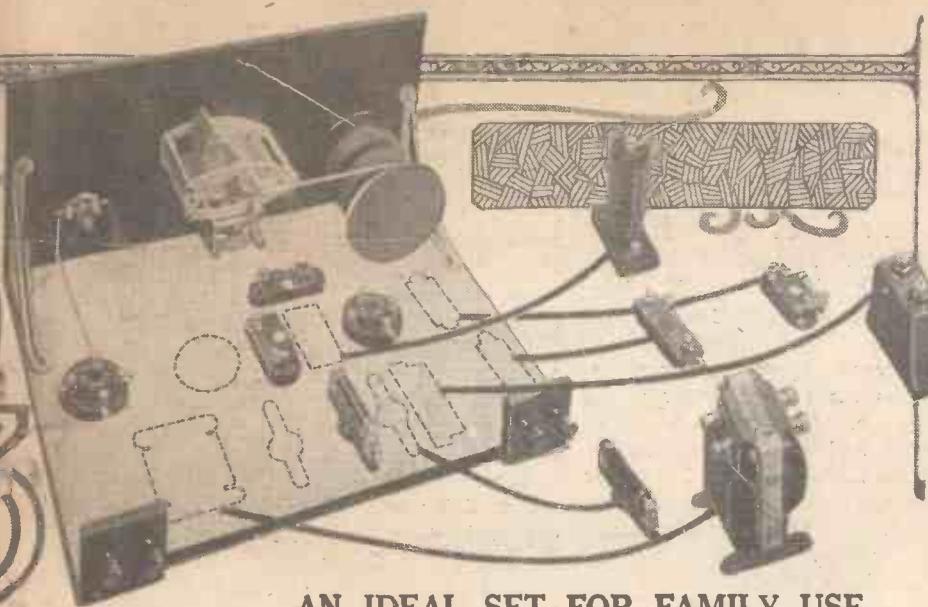
Three valve holders (Brownie, Igranic, Benjamin, W.B., Lotus, Formo, Burton, 'Trix).
0002-msd, fixed condenser with grid-leak clips

.0003-mfd. fixed condenser, with grid-break clips (Watmel, T.C.C., Dubilier, Graham-Farish, Atlas).
.0001-mfd. fixed condenser (Watmel, T.C.C., Dubilier, Graham-Farish, Atlas).
.00005-mfd. fixed condenser (Watmel, T.C.C.,

.005-mfd. fixed condenser (Watmel, T.C.C., Dubilier, Graham-Farish, Atlas).
 2-mfd. fixed condenser (T.C.C., Dubilier, Lissen, Hydra).

100,000-ohm resistance, 50,000-ohm resistance, 2-megohm resistance (Graham-Farish, Ready-Radio, Ferranti, Dubilier, Bulgin).





AN IDEAL SET FOR FAMILY USE

connections and possible short circuits. The panel needs four holes drilled in it for the components and five smaller holes for the fixing screws and panel-bracket bolts. This work should be done using the blueprint as a guide. The print itself should be temporarily attached to the surface of the ebonite at the four corners, and the holes can be drilled straight through. It is always advisable to make punch marks before starting drilling, for this prevents the point of the drill slipping before it has properly entered the ebonite.

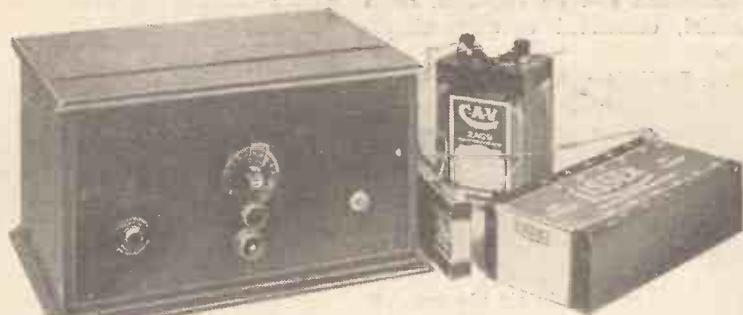
All the components on the panel are of the one-hole fixing type and the securing nuts should be firmly tightened, because there is nothing more annoying than the partial rotation of, say, a condenser when the knob is turned. It does not matter very much whether the parts are mounted on the panel before the panel is attached at right angles to the baseboard or whether the panel and board are first put together and

the panel components added one by one as the wiring proceeds.

Most of the wiring on the baseboard is done with stiff wire, and it is best to use insulated wire, because then it does not matter if one or two of the leads touch. However, if you follow the blueprint exactly and imitate the spacing shown quite clearly by the photographs, there will not be much possibility of the leads fouling one another.

The connections to the batteries are made by means of lengths of rubber-covered flex twisted in three groups and having connectors attached to the ends.

The leads are arranged in the



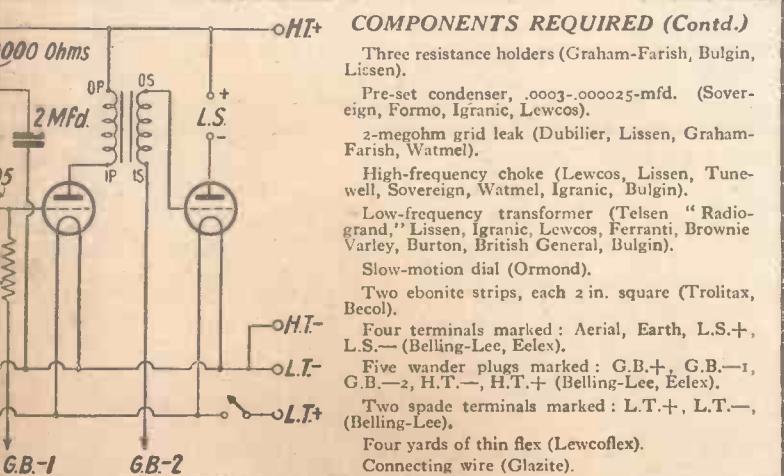
Note how simple is the control—ideal for family use

capacity type, with very small cells, are a false economy.

The detector valve should be of the medium-impedance H.F. type and can be chosen from the following :—2 volts : Cossor 210HF, Dario Univ., Marconi HL210, Osram HL210, Six-Sixty 210HF, Mullard PM1HF, Mazda HL210, Lissen HL210; 4 volts : Mullard PM3, Six-Sixty 4075HF, Osram HL410, Marconi HL410, Dario Univ., Cossor 410HF; 6 volts : Cossor 610HF, Marconi HL610, Osram HL610, Six-Sixty D610, Mullard PM5X, Mazda HL607.

The L.F. valve should be of the ordinary medium-impedance L.F. type, as the valves in the following list :—2 volts : Cossor

(Concluded at foot of next page)



terminals are for the loud-speaker connections. It would be inefficient and generally inconvenient to have flex connections at these two parts of the circuit.

Assembly

You should experience no trouble in screwing down the parts in their proper positions and wiring them up. Make sure that you get the transformer round the right way; it is not difficult to put the primary windings to the secondary terminals and vice versa. If a different type of transformer from that specified is used, the IP, OP and IS, OS connections may need reversing, but the instructions with the new transformer should be referred to.

Before you put the "Beginner's Regional 3" on test, and before the batteries are connected, make sure that all the wiring is correct, for thus you may prevent the ruin of three good valves. Either the full-size blueprint or the reproduction given last week is a great help in the checking process. If you can read theoretical circuit diagrams, then you may, for your own edification, like to check over the wiring with the theoretical circuit as well as with the wiring diagram.

At least 100 volts high tension will be required to work the set properly, and better results are to be had by the use of 120, or even 180 volts. An expensive eliminator is not necessary, but if one is using dry batteries the medium or super-capacity types should be chosen. Batteries of the small-

groups of H.T.,
L.T., and G.B.
This prevents
inter-coupling
between the
battery leads
and also re-
moves the
chance of mak-
ing a mistake
when connect-
ing up the
batteries. The
terminals on
one terminal
strip, of course,
are for aerial
and earth,
while the other

A PAGE FOR THE SET BUYER

A LOCAL-STATION PORTABLE

*Tested and reviewed
by "Set Tester" who
regularly contributes a
page of special interest
to the intending set buyer*



The P.B. Portable is designed for local-station reception

ALTHOUGH we are apt to protest against the tremendous power of the Brookmans Park stations, there is one advantage that may have been overlooked. I refer to the ease with which these powerful transmissions can be tuned in on a frame aerial, connected to quite simple apparatus.

The P.B. Radio Co. has taken advantage of the present state of affairs by producing a three-valve portable. This set relies for its effectiveness more upon the power of the local stations than upon inherent amplification.

Simple Circuit

The circuit is extremely simple, consisting of a detector with reaction followed by two stages of transformer-coupled low-frequency amplification. The valves used are selected from the Osram range.

The detector, in the set tested, was an HL210 valve. I would suggest a type H210 instead. This would give more amplification and would pass less high-tension current through the primary of the low-frequency transformer.

In attempting to account for a fairly low-impedance primary winding by the use of a low-impedance valve, there is a tendency to overlook the possibility of saturating the core, thereby reducing the inductance of the primary and so off-setting any advantage to be derived from the low-impedance valve.

The first low-frequency valve in the set tested was an L210 type. This might well be exchanged for an HL210, since the signal amplitude is not likely to be very considerable at this stage.

London, this portable admirably performed the function intended. National 261, at 41 degrees, and Regional 356, at 100 degrees, were both received at full loud-speaker strength.

A somewhat surprising aspect of the test was the good selectivity. The National disappeared within 3 degrees of its maximum adjustment, while the Regional occupied only 10 degrees around its maximum point of tune.

Sensitivity was as good as could be expected. The Midland Regional at 144 degrees was a fairly good loud-speaker signal. Carrier waves of Continental stations were picked up but no other station was received at really satisfactory loud-speaker strength.

In view of the low price of the P.B. portable, set-buyers will be interested in this account of its possibilities.

"THE BEGINNER'S REGIONAL THREE"

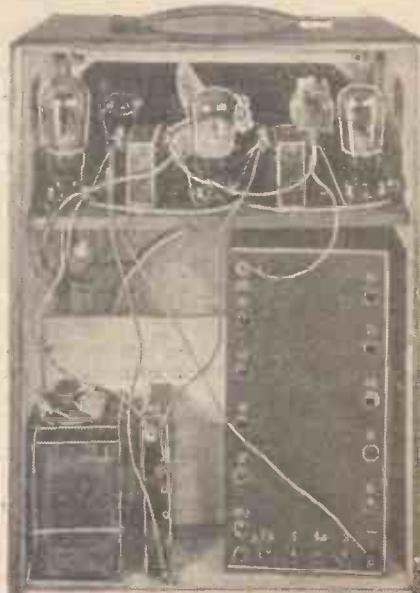
(Continued from preceding page)

210LF, Marconi L210, Osram L210, Six-Sixty 210LF, Mullard PM1LF, Mazda L210, Lissen L210, Dario Univ.; 4 volts : Mullard PM3, Six-Sixty 410D, Cossor 410LF, Marconi L410, Osram L410, Dario Univ.; 6 volts : Cossor 610LF, Marconi L610, Six-Sixty D610, Osram L610.

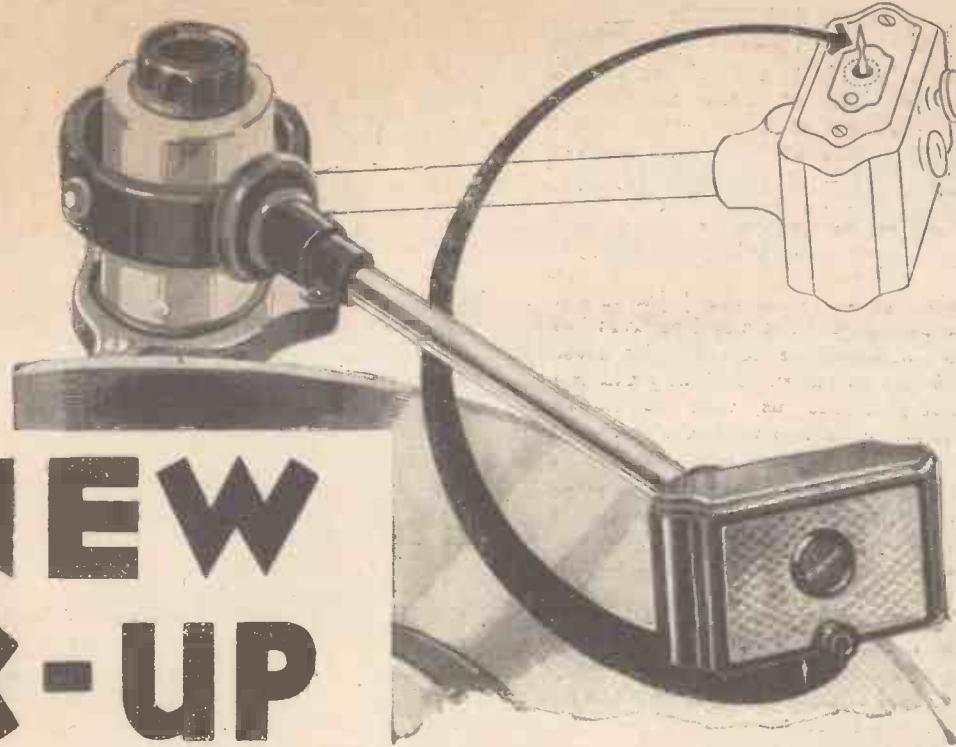
The power valve should not be of the "super" type, which consumes more H.T. and L.T. than is justified by average needs. The correct valve should be chosen from the following :—2 volts : Cossor 220P, Dario SP, Marconi P2, Osram P2, Six-Sixty 220P, Mullard PM252, Mazda P220, Lissen P220; 4-volts : Cossor 410P, Dario SP, Marconi P410, Osram P410, Six-Sixty 410P, Mullard PM4; 6 volts : Cossor 610P, Marconi P610, Osram P610, Six-Sixty 610P, Mullard PM6.

The "Beginner's Regional Three" is simple to operate. For an initial test the knob of the pre-set condenser should be screwed right in (after slackening off the locking nut), the coil switch knob should be pulled out for the medium waveband, the reaction should be set with the vanes apart, and the L.T. switch should be pulled out to the "on" position. Slow rotation of the aerial tuning control should then bring in one or other of the local stations, while 5XX can always be heard if the coil switch is pushed in.

The reaction may then be increased to sharpen tuning a little, and the pre-set condenser knob may be slackened off to increase the natural selectivity of the set.



Interior arrangements of the batteries in the P.B. portable



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BLUE SPOT 88

risk of chatter. The volume control works smoothly and noiselessly at all positions. By turning the pick-up over to the right it is automatically held free and clear of the turntable leaving both hands free for changing records and needles. Every detail has been carefully studied to ensure the best possible results.

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SYDNEY MOSELEY'S WEEKLY PROGRAMME CRITICISM

Period
Vaudeville
Good
English



Low-brow
or
High-brow?
Poor
Drama

THE "period vaudeville" introduces us to good old times and answers the jazz-ites who imagine we old fogies never had our joyous pieces. But why will the producer torment us with impossible galleryites? The two women who shriek above the rest create the atmosphere of "chucking-out" time in the Old Kent Road. Certainly I do not remember such goings-on in any of the music-halls I visited—and they were many and varied.

Unfortunately, I was not able to hear "Intimate Snapshots," one more of Lance Seiveking's ambitious efforts. A Fleet Street friend of mine thinks the newspaper reporter was misrepresented, as usual, so that I must have a word with Lance when I see him. Seiveking is a live "trier," and when I tell him he is rather too modern he denies the soft impeachment. I wish him success, anyway.

Most amusing was the discussion, "What is Good English?" between Lloyd James and St. John Ervine. I expected an interesting debate. As it was, it turned out to be one of the best given so far. The two men knew their job, did not overdo the fooling stuff, and closed down when it was time to close down.

St. John Ervine is one of the few broadcasters who "goes up one" in my estimation as a result of listening to him. Like Mr. Tomkin, of water-divining fame, he has no affectation. Being an Irishman, of course, helps him.

By the way, Mr. Lloyd James pronounced the word "dra-matist," while St. John Ervine called it "dram-atist." And, again, the announcer who was called in—I suppose, after a little rehearsing, and did quite well—made a *faux-pas* which should have filled to overflowing his letter bag next morning. He spoke about "Scotchmen," and repeated the offence. If Mr. Grisewood is still alive, I congratulate him.

I shall not enter into a discussion as to whether the accent of the metropolis is to be relied upon. I should say not. Capitals, as a rule, are far too cosmopolitan to be relied upon for a standard accent.

There have been many good wireless and military band concerts lately, and it is invidious to mention them. A friend of mine, however, thought there was too

much Gershon Parkington Quintet. That is the worst of popularity. One becomes satiated with the good things offered.

"Diversions No 10" was as good as its predecessors, and, although I am not interested in dirt-track racing, I certainly was amused and interested in the naive announcing of Mr. J. E. Hosking. He certainly is some enthusiast.

♦ ♦ ♦
Low-brow—or high-brow?

M F Cann, of Milton Regis, tells me he reads these notes "with a great deal of interest," but he adds: "Everybody knows 75 per cent. of the B.B.C. programme is high-brow." He thinks I am too down on the poor low-brow. He likes Clapton (*sic*) and Dwyer. I sympathise with my correspondent. Each man is entitled to his taste.

Another correspondent, H. A. L., of Warrington, wants to know why the B.B.C. does not give a church service at the ordinary church time. He says that there are a lot of people who cannot get to church—invalids, for instance, who would be able to listen-in for part of the time. "There are many churches wired for transmission purposes; so that the services could be transmitted at 6.30, news at 8, and then music and close down earlier. It would suit a lot of people."

"I cannot think of anyone who has been to church wanting another dose when they get home," he adds.

There is certainly a lot in what H. A. L. says, and one must persevere in asking the Programmes Department to alter the time in order to conform with the majority of listeners' wishes.

♦ ♦ ♦
The Four Feathers was one of the poorest adapted-for-wireless plays I have heard. Terrific liberties were taken with the original book, and, although one must bear in mind the limitations imposed by broadcasting, I think this play was on a par with many of the badly adapted films we see.

♦ ♦ ♦
"Oh, let us be joyful that the usual broadcast music is not specially 'written for broadcasting!' That special stuff the other night was hideous, outrivalling the 'contemporary' cacophonies in sheer ugly noise." From a postcard correspondent.

♦ ♦ ♦
I have only been able to listen to one of the "Architecture To-day and To-morrow" series of talks, and that was given by Mr. Harold Tomlinson, who dealt with the new spirit in design. I found the talk both enjoyable and interesting. He picked out some of the most prominent buildings of the day and dealt with each one in a masterly manner.

♦ ♦ ♦
In response to my recent remark that the pleasant lunch-time music seems to have disappeared, "Harold" writes to correct. He points out that light music at lunch time is still given by Leonard Kemp's and Max Jaffa's bands from the Piccadilly, by Georges Haeck from Frascati's, and by the orchestra of the Commodore Cinema. My correspondent is emphatic in his opinion that the last-named is one of the best and most versatile orchestras to broadcast.

I referred, of course, to the Saturday lunch-time music.

♦ ♦ ♦
Anent my recent comments on the "Pool of London" affair, "Lady Mary" writes: "There was just nothing in it; for all we know, the commentators might have been broadcasting from a bath-tub. Surely a little thought beforehand would have shown the organisers that, apart from the fact that it had a 'newsy' title, the broadcast would mean nothing but a few splashes and sirens?"



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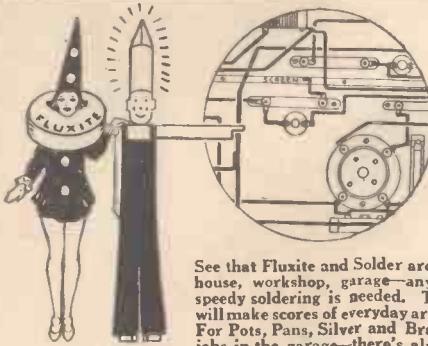
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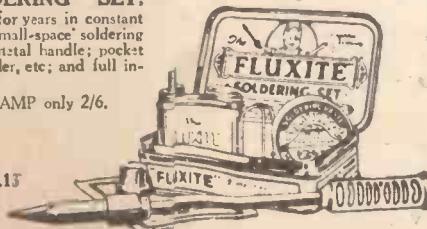
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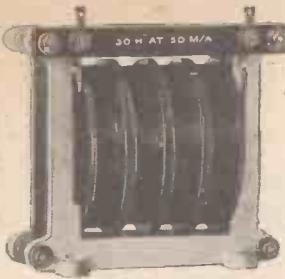


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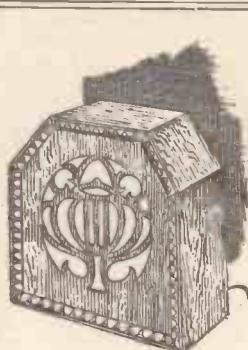
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*And described in
this issue is a*

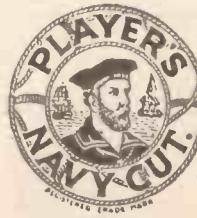
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"A.W." TESTS OF APPARATUS

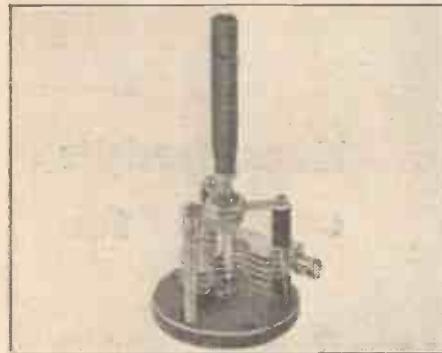
Conducted by our Technical Editor, J. H. REYNER, I.Sc. (Hons.), A.M.I.E.E.

Burne-Jones Neutralising Condenser

ALTHOUGH the advent of the screen-grid valve has made neutralised H.F. circuits less popular, there are cases when this form of amplification is desirable. In the first place screening is not so necessary, while in addition with two or more stages one can obtain particularly good selectivity for a given degree of amplification. In these days of high-power stations, amplification is not always the criterion of efficiency, and selectivity plays an equally, if not more important, part.

Messrs. Burne-Jones have just placed on the market a compact little neutralising condenser, designed to give a low minimum capacity and ample capacity range. Rigidity of the fixed and moving plates is a matter which has been given careful consideration in this component, and is of some importance, since an accidental contact between the two sets of vanes usually causes a short circuit of the high-tension battery.

In order to obtain this rigidity, and yet retain a low minimum capacity, the rotating spindle has a bearing at either end of the vanes, the top plate holding the bearing being in the form of a triangular framework supported at three points. An insulated spindle 2 in. long with a screw thread at the top controls the rotation, and can be operated with a screwdriver if desired.



A new Burne-Jones gadget—a neutralising condenser

The particular sample tested was not quite even in its motion throughout the 180-degree, arranged. This no doubt could be remedied easily, but otherwise this is the only criticism we have of a good component. The price is 5s.

Loewe Vacuum Resistance

WE have on numerous occasions used the vacuum resistances manufactured by the Loewe Radio Co., Ltd. Two of the chief merits of this resistance have always been their constancy and silence in operation, and the high accuracy of the tested

values of resistance as compared with the rated values.

We are somewhat surprised to note in a recent communication from the makers that the standard resistances are not rated to carry more power than 1 watt; we have been guilty on numerous occasions of exceeding this value considerably, and that without detrimental results in most cases.

We have now received from the makers a list of their new power resistances, and also a sample resistance capable of dissipating ten times this power (i.e., 1 watt). These are particularly suitable for use as decoupling resistances in mains amplifiers. The chief difference between these power resistances and the usual types is their size, for in order to dissipate heat, a greater cooling area is necessary. The tube is also filled with a suitable gas to assist heat dissipation. The resistances are made in the number of values varying from 1,000 ohms to 1 megohm, and also in two sizes, one rated at 0.5 watts and the other at 1 watt. The former is 1 3/4 in. long and sells at 2s., whilst the latter is 3 in. long and sells at 2s. 3d.

The sample submitted for test had a rated resistance of 1 megohm, and a power dissipation of 1 watt. When tested with a standard Megger the resistance was found to be exactly as stated, and indeed this is in conformity with our experience of these components, which can be recommended.

New Mullard Valve

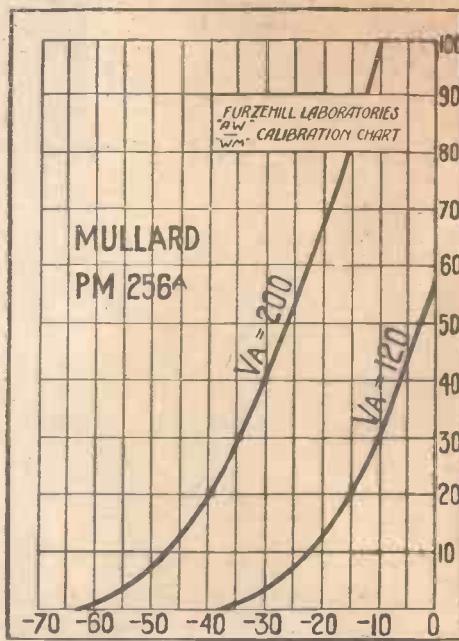
SCARCELY a month passes without some new achievement in valve design being made public. Recently many improvements have been made in the performance of power and super-power valves.

It is comparatively simple to design a super-power valve capable of handling a large output, provided that the filament and high tension potentials are sufficiently great. Such a valve, however, is distinctly limited in its application, necessitating complicated and costly mains eliminator apparatus and, therefore, being outside the reach of the user not equipped with an alternating current mains.

We expect, therefore, that many readers will be interested in a new valve produced from the Mullard valve factory. This valve, known as type PM256A, has a six-volt filament consuming .25 of an amp., and is designed to run off a maximum high-tension potential of 200 volts. The undistorted output is approximately 1,000 milli-watts, sufficient to operate effectively a large-type moving-coil loud-speaker. The characteristics, in fact, compare most favourably with

values requiring much greater potentials.

A glance at the characteristic curve shown on this page will give some idea of the capabilities of this valve. It will be noticed that with a potential of 200 volts



The characteristics of the new Mullard PM256A valve

on the anode the correct grid bias is approximately 33 volts, while the amplification factor is 3.6. Compare this with the characteristics of a normal super-power valve, and the difference will be most marked, although it follows that the high-tension current consumption is correspondingly increased. Super capacity batteries, or H.T. accumulators, should therefore be used. The valve is admirably suited for use with a D.C. eliminator, where the mains potential varies between 200 and 240 volts. Owing to the comparatively low filament current consumption the filaments may also be operated off the mains by placing them in series with a suitable resistance across the supply.

The PM256A will undoubtedly supply the demand for a power valve of exceptional performance coupled with comparatively low anode potentials, and economical filament consumption. The full details, as found in our laboratory, are given below. These figures are in agreement with the makers' rating.

	H.T. 120 v.	H.T. 200 v.
Fil. volts	6	6
Amps.	0.25	0.25
Internal resistance	1650	1450
Amplification factor	3.3	3.6
Grid bias	17	33

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ON June 28 listeners will be favoured with a record number of commentaries. The first will give a description of the sailing of s.s. *Britannic* on her maiden voyage from Liverpool, followed by an eyewitness account of the All-England Lawn Tennis Tournament from the Centre Court, Wimbledon. Later, a visit is to be paid to the R.A.F. Pageant at Hendon aerodrome, and then to the River Thames for a radio-view of the Motor Boat Race for the Duke of York's Cup over the Putney-Mortlake course. Again, during the afternoon a further visit is paid to Wimbledon, and finally the "mike" will be transported to Lords for an account of the Cricket Test Match.

The recent success of the Dumbleton Fête and Gala has prompted its organisers to book again the Village Hall of Dumbleton-in-the-Dale, for a repeat performance on June 13. On this date London Regional listeners are to hear the programme broadcast by the Midland Regional station.

The KDKA (East Pittsburg, U.S.A.) transmissions are now broadcast daily on three different wavelengths according to the following time schedule: 2-6 p.m. (19.7 metres); 6-11 p.m. (25.4 metres); and 11 p.m. to 6 a.m. B.S.T. (48.8 metres).

The Twelve Thousand is the title of a German play by Bruno Franck, and of which an English microphone version has been written by Cecil Lewis. It will be broadcast from the Savoy Hill studios in July. Another play in rehearsal for presentation that month is Anstey's fantastic comedy *The Brass Bottle*.

On June 4, as a contributor to the *Stars and Stripes* series, we are to hear Ruth Hanna McCormick, who will be speaking from America. She is a candidate for election to the Senate and hopes to represent Illinois as the first woman Senator.

New York will hold its seventh annual radio exhibition in Madison Square Garden from September 22 to 27. The Chicago exhibition will be held during the week of October 20.

A French inventor has developed a speaking signal for motor cars. Just in front of the driver is a microphone. As a pedestrian starts across his path, the driver, without raising his voice, says into the instrument: "Look out please, you'll get run over!"

According to the *Union Internationale de Radiodiffusion* of Geneva, over 835 plays have been broadcast by the European studios since June 1, 1929. Of this number 200 were specially written for the microphone.

(More Radiograms on next page)

H. & B.**BEGINNER'S REGIONAL 3**

This will interest you.

The H. & B. complete Kit of Components to construct this ideal set contains only specified parts exactly as used by the designer. Panel, strips drilled ready together with 5-ply baseboard and full-sized blueprint, nothing else to buy. Cash Price £418:0 Or upon H. & B. Gradual Payments, 26/- down, and 6 monthly payments 11/8. Hand-polished Oak Cabinet, 14/6 extra. 3 Specified Mullard Valves, 33/6 extra.

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Cash Price £7:12:10

This set can be seen at our showrooms any time between 9.30 and 6.30 for one month.

Don't take the risk of unsatisfactory results. Let us construct your set for you. We will undertake to construct free of charge any set advertised by us with components purchased for cash from us.

Any set will be constructed and despatched within 48 hours upon receipt of order. Each set will be definitely aerial tested before despatch. Full details will be sent upon request of any kit advertised by us.

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**EVERYMAN'S
WIRELESS**

By ERNEST H. ROBINSON (5 Y.M.)

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

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HAVE YOU SEEN THE LOTUS ALL-ELECTRIC TRANSPORTABLE?



**3 Valves Only
yet giving
5 Valve Power**

All Electric, instead of Battery operated, employing only three valves instead of the usual four or five, yet losing nothing in strength or clarity, the Lotus S.G.P. All Mains Transportable Receiver stands alone in its class.

Entirely self-contained—needs no aerial or earth wires—Loud-speaker included in Cabinet—mounted on turntable for directional reception—running costs approximately 4/- per annum.

Prices: Oak Cabinet, £25 4s. 0d. cash, or £2 7s. 0d. down and 11 equal monthly instalments.

Mahogany or Walnut Cabinet, £26 5s. 0d. cash, or £2 9s. 0d. down and 11 equal monthly instalments.

Write for full particulars.

LOTUS

ALL-ELECTRIC
TRANSPORTABLE

Garnett Whiteley & Co. Ltd.
(Dept. A.W.8)
Lotus Works, Mill Lane, Liverpool.

When the German airship *Graf Zeppelin* crossed France on May 18, on her trip from Friedrichshafen to Seville, prior to her departure for South America, her signals were picked up by Radio Toulouse. The French station re-broadcast them in order that Stuttgart and Koenigswusterhausen might relay them for the benefit of German listeners.

On May 8 and 10, the Polish station at Katowice broadcast the song of the nightingale. For this purpose a relay was carried out from a forest in Upper Silesia. For the information of distant listeners announcements were given out in the French and English languages.

On May 18, at 10.40 p.m., B.S.T. Radio Toulouse transmitted a special concert offered by the Automobile Association of Great Britain.

It is reported from Belgium that a new broadcasting station is to be opened towards the end of the present summer; it will operate on 208.3 metres, the third wavelength allotted to Belgium.

The short-wave transmitter at Rome-Cecchignola has now started its broadcasting tests on 80 metres, a wavelength which will probably be used at night for the transmission of news bulletins for the benefit of Italians overseas.

The Glasgow and West of Scotland Mission to the Outdoor Blind has been instrumental in installing over 250 wireless sets in the homes of invalid or lonely blind people in the district.

It is unofficially stated that the new Trieste broadcasting station will be formally opened in October next. Following this installation, work is to be started immediately on the Palermo transmitter as it has been found that the Naples station cannot provide an adequate service to Sicily.

Listeners to Budapest on May 29 will hear a special concert in which over one thousand gipsy musicians are taking part.

Plans for the erection of a short-wave receiving station at Tokio (Japan) are now completed, with a view to the relay of European programmes.

WIRELESS
MAGAZINE

*The Big British
Wireless Monthly*

1/-

Cawston



DIX-ONEMETERS
are now only 50/-
A remarkably low price for a meter worth £1.
For Novice or expert.
TEST BOOKLET FREE.

RADIO TESTERS
and the
DIX-ONEMETER

They use it because it has Two Clear Scales with Mirror for Accurate Reading; only 6 Terminals, but 50 Ranges.

The Dix-onemeter conveniently fits the pocket yet it covers the whole range of D.C. Electrical Measurements.

No switch to cause disastrous results; independent multipliers for each range. A Safety Button controls moving coil.

Latest Model. To 1st Grade Brit. Eng. Standard. Mirror Double Scale. A real Precision Multi-Measuring Instrument. Multipliers from 50 micro-amps to 150 amps and 20 millivolts to 2,000 volts.

ELECTRADIX RADIOS
218, UPPER THAMES STREET, LONDON, E.C.4
Telephone: City 0191

LETTERS TO THE EDITOR



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

The Regional Scheme

SIR.—Now that the Regional Scheme has got well into its swing, it seems appropriate to draw attention to its very serious limitations, at least from the point of view of the writer, and he believes of many other people.

The apparent aim of the B.B.C. is to supply the whole country with one programme, or at the very most two; last Sunday evening was a typical example when every station in the country broadcast the same programme.

As compared with the service of a few years ago, this seems a very retrograde step.

Further, the power of these new stations is so great that it would appear to be the intention of the B.B.C. that everyone shall be in a position to operate their moving-coil speaker from a crystal set, whilst at the same time making foreign reception out of the question to anyone who cannot afford a small fortune for a multi-stage receiver capable of cutting down the local stations adequately.

The position is, of course, not yet at its worst, but I would suggest that the ideal solution of this, probably from the B.B.C. point of view, would be to shut down all stations except 5XX, which anyone can receive; although possibly this might have the unfortunate effect of giving listeners too much latitude in the way of being able to listen with ease to Continental transmissions that actually have the merit of being more interesting for a greater part of the time than the majority of B.B.C. transmissions.

Finally, the B.B.C.'s idea of contrasted programmes, on the rare occasions when such are given, frequently takes the form of, on the one hand, chamber music and,

on the other, symphony concerts. Each of these forms of entertainment are acceptable, but that one should be considered as an alternative entertainment to the other is somewhat strange.

J. L. B. (Manchester).

Superhets and Quality

SIR.—I was extremely interested in the recent remarks by "Thermion" with regard to the super-heterodyne.

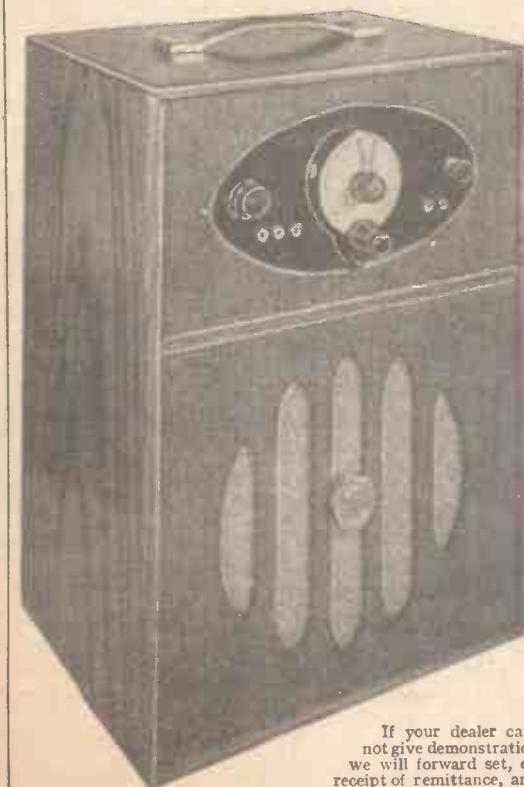
I have myself experimented with this circuit for about five years and consider that it is quite unbeatable, both for ease of working and selectivity. If properly constructed and designed it is also hard to beat for purity.

"Thermion" stresses the fact that the lack of purity is almost always caused by the second detector overloading, but I should also like to point out that it is

"A.W." Solves your Wireless Problems

REMARKABLE PERFORMANCE— REMARKABLE

PRICE



The Harmony Three, housed in handsome oak cabinet, has been specially designed to receive the Regional programmes, at full loud-speaker strength with remarkable purity of tone.

This receiver, prior to being placed before the public, was submitted to AMATEUR WIRELESS for test. On page 722 of this issue an extensive report is given by "Set Tester," as he has reviewed all the well known sets at present on the market, his opinion carries great weight. His suggestions regarding valve improvements, after considerable experiments, have been adopted, resulting in an even better performance.

By an unique device the tuning condenser can be locked at any point on the dial. Foreign stations are received by attaching outdoor aerial to sockets provided. There are also gramophone pick-up sockets and a safety fuse.

Set complete with frame
aerial, loud-speaker, valves,
battery, accumulator, etc.,
ready to switch on. £7:10:0
(Royalties 15/-)



Head Office : 35, OXFORD ST., W.1
Works : ACTON.
Phone : Gerrard 3546
Everything Radio supplied. We quote by return and deliver without delay. Free expert advice on request. Write now.

When Asking Technical Queries

PLEASE write briefly

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

Trade Enquiries Invited.

If your dealer cannot give demonstration we will forward set, on receipt of remittance, and undertake to refund in full if not completely satisfied.

extremely difficult to prevent the last valve being overloaded.

In my own set I have up till recently used anode-bend rectification for the second detector, using a P.M.6D with 150 volts on the plate and about 12 to 15 volts grid bias, but am now using, and prefer, power grid detection.

I use only one low-frequency stage, with two L.S.5A's in push-pull, with 300 volts on the plates, and even then these valves overload very slightly on loud passages.

Super (Bexley).

A Disappointed Listener

SIR.—Is it not time somebody started a "Wireless Broadcast Protection Society"?

The B.B.C. has what it designates as a "National Programme," but what is it: following the Morning Service and Weather Forecast we have silence until noon.

Then immediately following the noon concert comes the Education (sic) programme. Are we to pay a wireless licence and an extremely heavy education rate in order to give teachers a daily holiday; and what extraordinary piffle is put through as education.

Wireless listeners should insist on a "National" programme throughout the day, or be allowed enjoyment of Continental programmes without being called upon to help the upkeep of a decrepit concern.

C. A. P. (Bentham).

**FOR ANY
OF THESE
WIRELESS
SETS**

**THE MULLARD ORGOLA
HARTLEY DUAL THREE
"MR. EVERYMAN'S SET"**

Your expensive valves are safe-
guarded against accident. A
fuse should be incorporated in
every set. Send for details.

Your expensive valves are safe-
guarded against accident. A
fuse should be incorporated in
every set. Send for details.

Your expensive valves are safe-
guarded against accident. A
fuse should be incorporated in
every set. Send for details.

An advertisement for COMPETA FUSES. The top half features the word "COMPETA" in large, bold, sans-serif letters, with "FUSES" below it in a slightly smaller but also bold font. To the left of the text is a detailed illustration of a screw-in fuse with its internal components visible. Below the main title, the words "Genuine '06 Type" are printed. In the bottom right corner, there is a large, stylized number "6" above the letters "D EACH", indicating the price.

LOOK FOR THE TRADE MARK

A. F. BULGIN & Co. Ltd. 9-10-11, CURSITOR STREET
CHANCERY LANE, E.C.4

RAYMOND'S

27 & 28a, LISLE ST., LONDON, W.C.2

WE CAN SUPPLY
any product of the following manufacturers direct from stock.
Ormond, Tungsram, Triton, Mullard, Cossor, Marconi, G.E.C., Ekco, Regentone, Mazda, Lewcos, Ever Ready, Siemens, Dubilier, Telsien, Philips, Jackson, Amplion, Etc.
Send us your enquiries please.
We quote fair prices.

SEND US A LIST
of your requirements
and we will quote a
special cash price
where possible, or just
mention the name
of the circuit you
wish to build.

**MCMICHAEL, ORMOND,
PYE, LOTUS, G.E.C.**
or any other make of portable wireless
supplied on EASY TERMS; write for de-
tails. Small deposit.
Special Display and Demonstration Room.

THE LARGEST

MULLARD | THE "BEGINNER"

"MASTER TWO"
All parts as specified.
Post paid £3:17:6
LATEST
IMPROVEMENT
for MULLARD "MASTER THREE" SET, an extra
H.F. UNIT. **42/-**

**THE " BEGINNER'S
REGIONAL THREE"**
Fully described in this issue. Thoroughly recommended to those in difficulty with Regional programmes. Complete as specified. £4 : 4 : 0
With Oak Cabinet and 3 Mullard Valves £6 : 3 : 0

ADVERTISING OF K. RAYMOND, LTD.

ADVENT W. MEYER & CO., W. RAYMOND, LTD.

BROADCAST TELEPHONY

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

All wavelengths marked with an asterisk have been allotted according to the *Plan de Prague*.

anode of the detector valve so that this may function efficiently.

Complete constructional details and operating notes will be given next week, together with further points of comment regarding the circuit. In the meantime a

(Continued on next page)

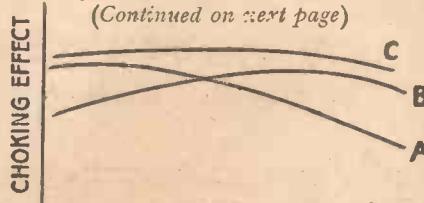


Fig. 2. Characteristic curves of three chokes

GREAT HOME TEST OFFER!

TO PROVE UNEQUALLED SUPERIORITY
over all other types of H.T.
Don't buy another dry Battery.

STANDARD CARTRIDGE

PERMANENT H.T. SUPPLY RE-CHARGES ITSELF OVERNIGHT

This remarkable regenerative battery has proved, to the satisfaction of thousands of skilled set users, that no other type of battery provides this smooth, unfluctuating current that banishes the nuisance of "background" and improves quality and volume of reception out of all recognition.

Standard Battery cells are self-regenerative and give trouble-free service throughout their twelve or more months' use.

For 2- or 3-valve sets.
2 trays (as illustrated) of No. 2 cells, 96 volts. 7.6 down and 1.11 monthly payments of 7/6. CASH £2. 2. 11. Spare No. 2 cells (complete except chemical), 11 volts each, 5/6 per doz. Any voltage supplied.

D.8 Battery:
108 volts, including oil and chemical, but without trays, £1. 14. 9.
All Batteries supplied on deferred terms if desired.

Write for full particulars to:
THE STANDARD BATTERY CO. (Dept. A.W.),
184/188, Shaftesbury Avenue, London, W.C.2
M.B.

EASY TERMS

We SPECIALISE in the supply of all Good Quality Radio Sets, Components and accessories on Easy Terms. We will give you efficient service. Send us your list of requirements and a quotation will be sent by return.

LONDON RADIO SUPPLY COMPANY
11 Oat Lane, Noble St., London, E.C.2

NATIONAL 1977

LET "A.W." SOLVE YOUR WIRELESS PROBLEMS

list of components is given so that those readers who feel that they would like to make up this receiver for Whitsun can

COMPONENTS REQUIRED

Cabinet (Carico).
Ebonite panel, 13 in. by 5½ in. (Trolitax, Becol).
Baseboard, 13 in. by 4½ in. (Camco).
.0005-mfd. drum-drive variable condenser with dial (left-hand) (Polar, Lotus, Burton, J.B., Ormond).
Screen-grid valve-holder (W.B., Lotus, Junit, Bulgin, Parex, Benjamin).
Two anti-microphonic valve holders (Lotus, W.B., Benjamin, Igranic).
Two high-frequency chokes (Wearite, Lewcos, Bulgin type S.G., Watmel P.X.3, British General, Lissen).
Low-frequency transformer (Varley, Ni-cote 11, Lissen, Telsen, Ferranti, Igranic, Lotus, Burton).
1-mfd. fixed condenser (Lissen, T.C.C., Dubilier, Hydra, Helsby).
.0003-mfd. fixed condenser S.P. type (T.C.C., Dubilier, Watmel, Graham-Farish, Lissen, Atlas).
1-megohm grid leak (Lissen, Dubilier, Watmel, Igranic).
.0002-mfd. fixed condenser (T.C.C., Lissen, Dubilier, Watmel, Graham-Farish, Atlas).
.002-mfd. fixed condenser (T.C.C., Dubilier, Lissen, Atlas, Watmel, Graham-Farish).
.38-mmfd. reaction condenser with insulated spindle (Igranic, Bulgin).
Two push-pull switches (Bulgin, Lissen, Lotus, Benjamin).
Two panel-brackets (Lissen, Ready Radio, Camco).
Special aluminium screen (Ready Radio, Parex, H. & B., P.B.).
Loud-speaker unit and cone complete (Six-Sixty, Blue-Spot, Lissen).
Six wander plugs (Igranic, Springwire, Clix, Belling-Lee).
Two spade tags (Clix, Belling-Lee).
Four yards thin flex (Lewcos).
Glazite for wiring.
Two ounces 22 d.s.c. for short-wave frame aerial.
Four ounces 28 d.s.c. for long-wave frame.

place an order for their parts straightaway. The cost of the parts is relatively little and the receiver is one which should give good programmes on four or five stations wherever the reader happens to be situated.

The reason the receiving aerials of the long-wave transatlantic wireless telephone were taken so far north as Cupar, in Scotland, was that it was found that atmospherics were much weaker there than in the south.

Featuring the work of contemporary Scots composers, the B.B.C. has set itself to provide a new series of chamber music concerts for listeners on the north side of the Border.

BELLING-LEE
The World's Greatest
WANDER PLUG
NOW ONLY
3D.

BELLING-LEE FOR EVERY RADIO CONNECTION

Belling-Lee Battery Cord specified in "Radio for the Million." Price 5/9.

Adv't. of Belling & Lee, Ltd., Queenway Works, Ponders End, Middlesex.

FULL-SIZE BLUEPRINTS

When ordering, please send Postal Order, NOT STAMPS

CRYSTAL SETS (6d. each)

B.B.C. Brookman's Park Set	AW206
Regional Crystal Set	WM176

ONE-VALVE SETS (1s. each)

R.B.C. Official One	AW208
A.I.	WM153
Hirtley Single-valver	WM199

TWO-VALVE SETS (1s. each)

Loud-speaker America Two	AW190
Talisman Two (D, Trans)	AW194
British Broadcast Two (D, Trans)	AW215
Easy-tune Two (D, Trans)	AW226
Wavelets Two (D, Trans)	AW229
No-battery A.C. Mains Two (D, Trans)	AW230
Clipper Two (D, Trans)	WM135
Brookman's Two (D, Trans)	WM168
Programme Two (D, Trans)	WM177
New Crusader (D, Trans)	WM182
Radio-Record Two (SG, D)	WM187

THREE-VALVE SETS (1s. each)

All-wave High-mag. Three (D, 2 Trans)	AW199
Knife-edge Three (D, RC, Trans)	AW201
Talisman Two-three (D, RC, Trans)	AW203A
Wide World short-wave Three (HF, D, Trans)	AW207
Everybody's Three (SG, D, Trans)	AW209
1930 Ether Searcher (SG, D, Trans)	AW211
New All-Britain Three (HF, D, Trans)	AW214
Best-by-Ballot Three (SG, D, Trans) Price 4d; free with copy of "AW"	AW217
Brookman's By-pass Three (D, 2 Trans)	AW220
Everybody's all-electric Three (SG, D, Trans)	AW221

—A.C.—
1930 Clarion Three (SG, D, Trans)
 AW223 |

Auto-coupler Three (D, 2LF)
 AW225 |

Beginner's Regional Three (D, 2LF)
 AW233 |

Standard Coil Three (HF, D, Trans)
 WM117 |

Short-wave Link (D, RC, Trans)
 WM142 |

Fanfare (D, 2 Trans)
 WM157 |

Brookman's Three (SG, D, Trans)
 WM161 |

Community Three (D, RC, Trans)
 WM164 |

New Q3 (SG, D, Pentode)
 WM167 |

Brookman's Push-Pull Three (SG, D, Trans) 1/6
 WM170 |

Celerity Three (SG, D, Trans)
 WM173 |

All-nations Three (D, 2 Trans)
 WM178 |

Inceptordyne (SG, D, Pentode)
 WM179 |

Brookman's A.C. Three (SG, D, Trans) 1/6
 WM184 |

Music Marshal (D, 2 Trans)
 WM190 |

Gramo-Radio D.C. Three (SG, D, Trans)
 WM196 |

Concert Three (D, 2 Trans)
 WM198 |

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

Clarion All-electric Three (SG, D, Trans)	AW200
A.C. Rectifier	AW202
Music-Lover's Gramo-radio (SG, D, RC, Trans)—1s. 6d.	AW202A
Music-Lover's Gramo-radio (Loud-speaker)	IS.
Standard-coil Four (HF, D, 2 RC)	AW202B
Dominions Four (2SG, D, Trans)	WM122
Arrow (SG, HF, D, Trans)	WM134
1930 Monodial (2SG, D, Trans)	WM154
Electric Four (All A.C.—SG, D, RC, Trans)	WM162
Outpost Four (SG, D, 2 Trans)	WM165
Brookman's Four (2SG, D, Trans)	WM174
Transportable Four (SG, D, 2 RC)	WM180
Super Q (SG, D, 2 Trans)	WM189
Lodestone Four (HF, D, RC, Trans)	WM193
Searcher's Four (SG, D, RC, Trans)	WM194

FIVE-VALVE SETS (1s. 6d. each)

James Quality Five (2SG, D, RC, Trans)	AW227
All-wave Lodestone Five (HF, D, RC, Push-pull)	WM146
1930 Five (2HF, D, RC, Trans)	WM171
Dual-screen Five (2SG, D, RC, Trans)	WM185
Radio-Record Five (SG, D, Trans-parallel)	WM188
Overseas Five (3SG, D, Trans)	WM191

AMPLIFIERS (1s. each)

A.W. Gramophone Amplifier	AW205
Brookman's Separator (HF Unit)	AW212
Two-valve Amplifier	AW216
"Mag" Gramo Unit	AW224
Concentrator H.F. Unit	WM169
Radio-Record Amplifier (DC Mains)	WM183

MISCELLANEOUS (1s. each)

Short-wave Adaptor (1 v.)	AW183
Simples H.T. Unit	AW197
By-pass Unit (Wavetrap) with copy "AW"—4d.	AW218
"Twin" Brookman's By-pass (6d.)	AW222
"A.W." Paper Loud-speaker	AW231
James H.T. and L.T. Charging Unit	AW232
Simplest H.T. Eliminator for D.C. Mains	AW234
Two Ampere Low-tension Unit	WM147
A.C. Mains Amplifier	WM149
H.T. Unit for A.C. Mains	WM159
"W.M." Linen-diaphragm	WM172
Trimmer (Selectivity Unit) (6d.)	WM181
Brookman's "Wipe-outs"	WM186
Short-wave adaptor for Overseas Five	WM192

PORTABLE SETS

Holiday Portable Three (D, RC, Trans)	AW188
Music Leader (SG, D, RC, Trans) with copy "AW"	AW203
Merry-maker Portable (D, 2 Trans)	AW228
Wayfarer Portable (Super Heti)	WM139
Pedlar Portable Two (D, Trans)	WM195
Pedlar Portable Three (D, 2 Trans)	WM197

Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of any of these sets can be obtained at 1s. 3d. and 1s. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine" sets.

AMATEUR WIRELESS 58-61 FETTER LANE LONDON, E.C.4

WEARITE COMPONENTS

Modern Coils for Modern Circuits

Sole Manufacturers under licence

Binowave 1930 Coil Units are now made in Types A, C and D. (B Unit now discontinued in favour of C). C Unit has a flexible lead to sockets to enable connection to be made to centre tap or end of primary winding.

D Unit may be used to convert "Touchstone" or other types of sets to Dual Wave working.

TALISMAN COILS

An Aerial Coil is now in production for use with Anode Coil.

Send for particulars.

H.F. By-Pass Unit 5/-
Transformers for "Orgola" H.T. Supply Unit 30/-
Write for free illustrated lists.

WRIGHT & WEARIE, Ltd., 740 High Road, Tottenham, N.17
Phone: Tottenham 3847/8.

ULTRA SHORT-WAVE AND BROADCAST RECEPTION

The Concert Three is intended for the reception of ultra short-wave transmissions as well as of the ordinary medium and high-wavelength broadcast bands.

Standard two-contact plug-in coils are utilised.

Besides receiving a fair number of broadcasting stations at loud-speaker strength, anyone building this set can expect to get short-wave stations from countries as far distant as Australia and the United States. It is simple to make and is fully described in "Wireless Magazine" for June.

OTHER CONTENTS OF THE "WIRELESS MAGAZINE" ARE:

The Inductor Loud-speaker, a new principle fully explained—THE GRAMORADIO D.C. THREE, which takes all its power supply from the mains—Using an L.F. Transformer Intelligently, by W. James.—Problems of Recording Sound, by Captain H. J. Round, M.I.E.E.—THE HARTLEY SINGLE-VALVER, a simple set based on one of the most popular circuits—in all, 50 features—a splendid shillingsworth.



"THE CONCERT THREE"

WIRELESS MAGAZINE

for JUNE is NOW on Sale. Get your copy without delay, 1/-

GET INCREASED EFFICIENCY and GREATER SELECTIVITY with

Why go to the trouble and expense of erecting an outdoor aerial when you can plug in the Ducon to any light socket and get a selective aerial system? The Ducon fits like an electric bulb a twist and it's in.

There is nothing in the Ducon to go wrong or wear out. It lasts indefinitely and its price is a fraction of the cost of erecting an outdoor aerial.

Ask your dealer to show you the Ducon.



The **DUCON**
LIGHT SOCKET AERIAL

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

DUBILIER CONDENSER CO. (1925), LTD.
DUCON WORKS, VICTORIA ROAD, N. ACTON, LONDON, W.3



The family favourite

THE fall in the value of metals and raw materials, and increased production enable us to reduce prices.



ARE DOWN IN PRICE

WINNER SERIES

60 VOLTS	X. 6'6
66 VOLTS	7'6 7'
99 VOLTS	1K6 10'6
120 VOLTS	14. 13'

These reductions give value second to none, for two-valve sets requiring 6 m.a. emission. Ask for an EVER READY next time if you require 100% service at minimum cost.

THE EVER READY Co. (G.B.) Ltd.
HERCULES PLACE, HOLLOWAY, LONDON, N.7

Obtainable Everywhere